The PHOTOFACT Servicer

SET 454 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ SEPT., 1959

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This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

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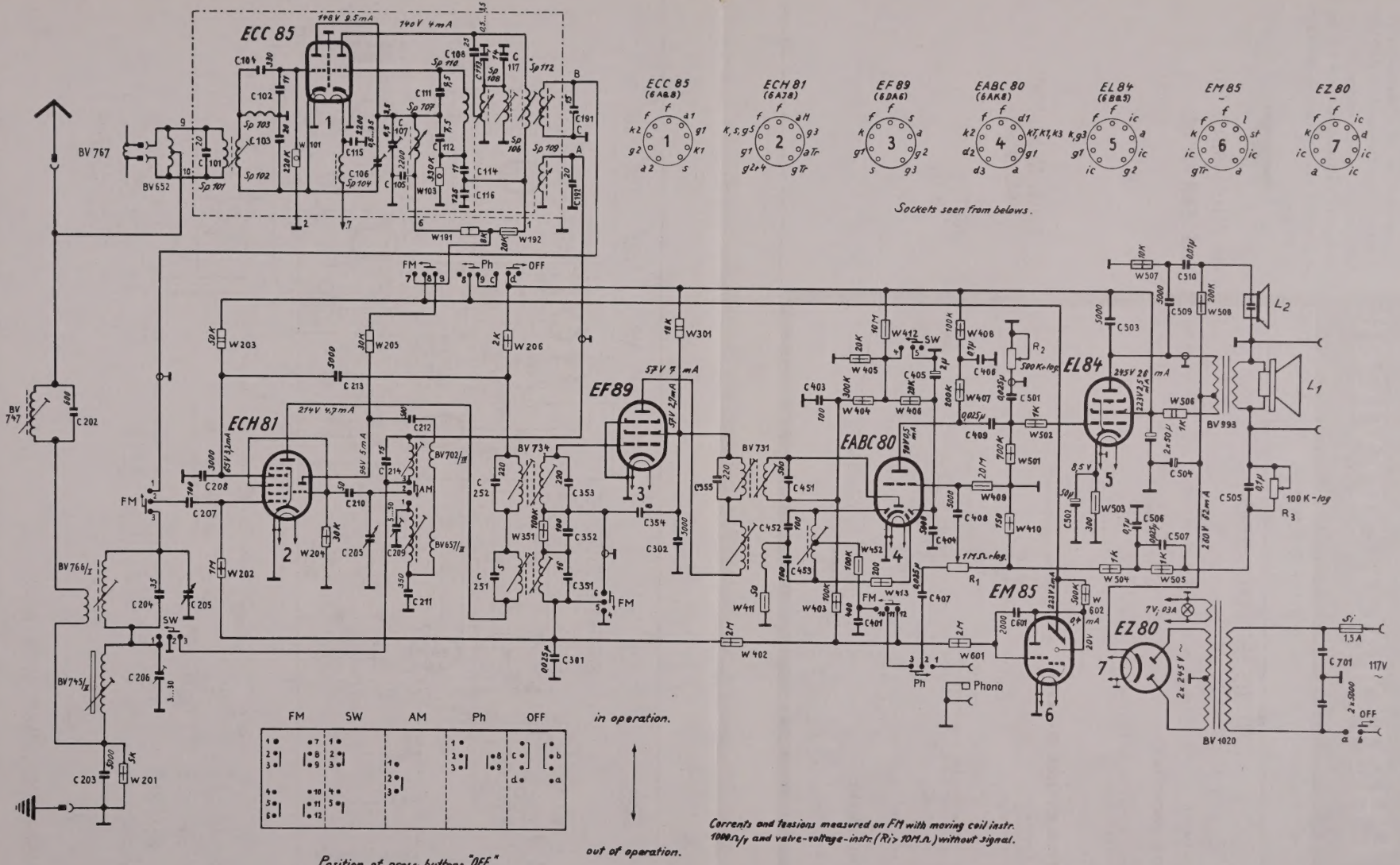
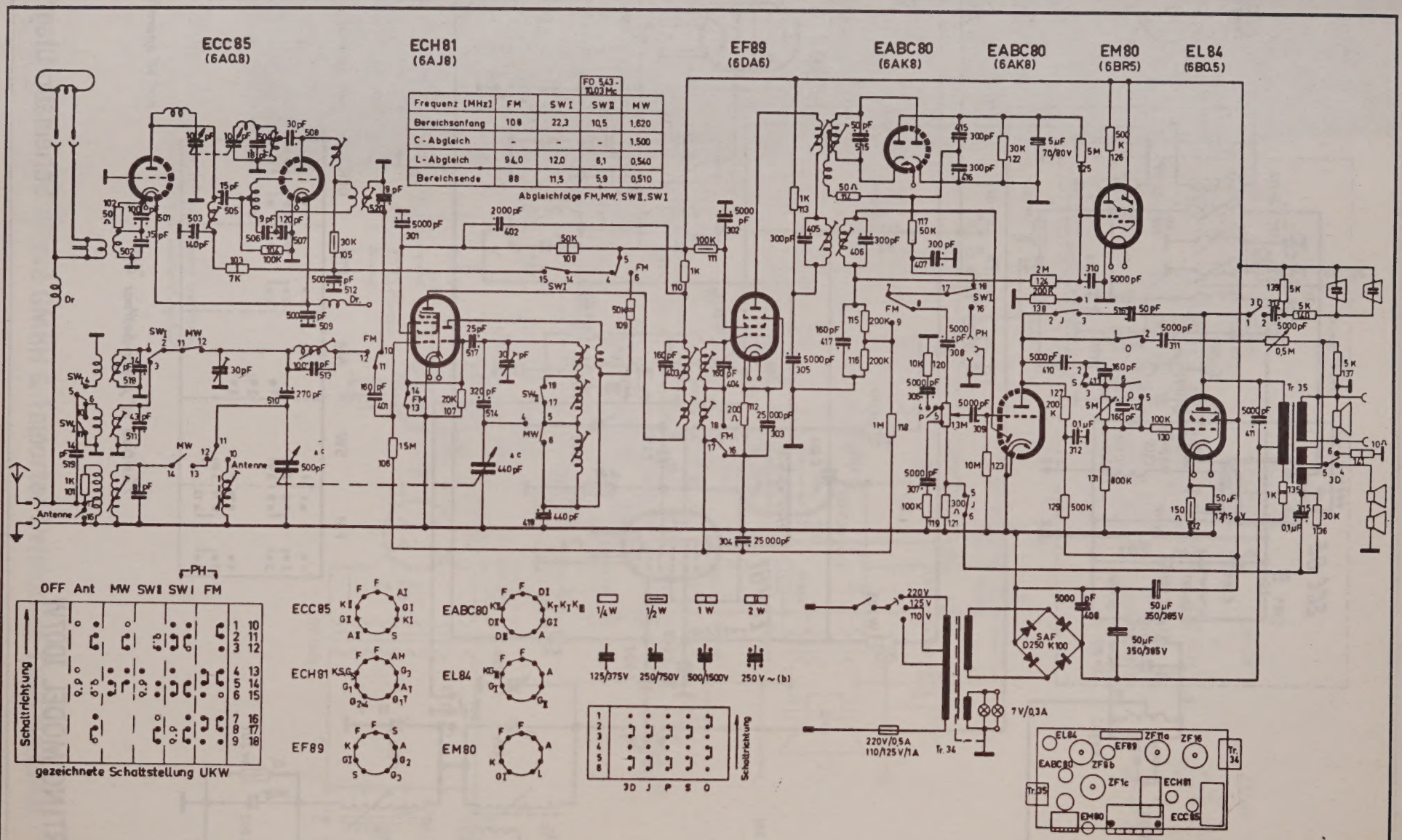


KORTING MODEL 1007W

Schematic Diagram Courtesy of Korting Radio Werke GMBH & Importer Delmonico International



KAISER MODELS W645, W648, W649

Schematic Diagram Courtesy of Kaiser -Werke and Importer Delmonico International.

PHOTOFACT* Folder with CIRCUITRACE*

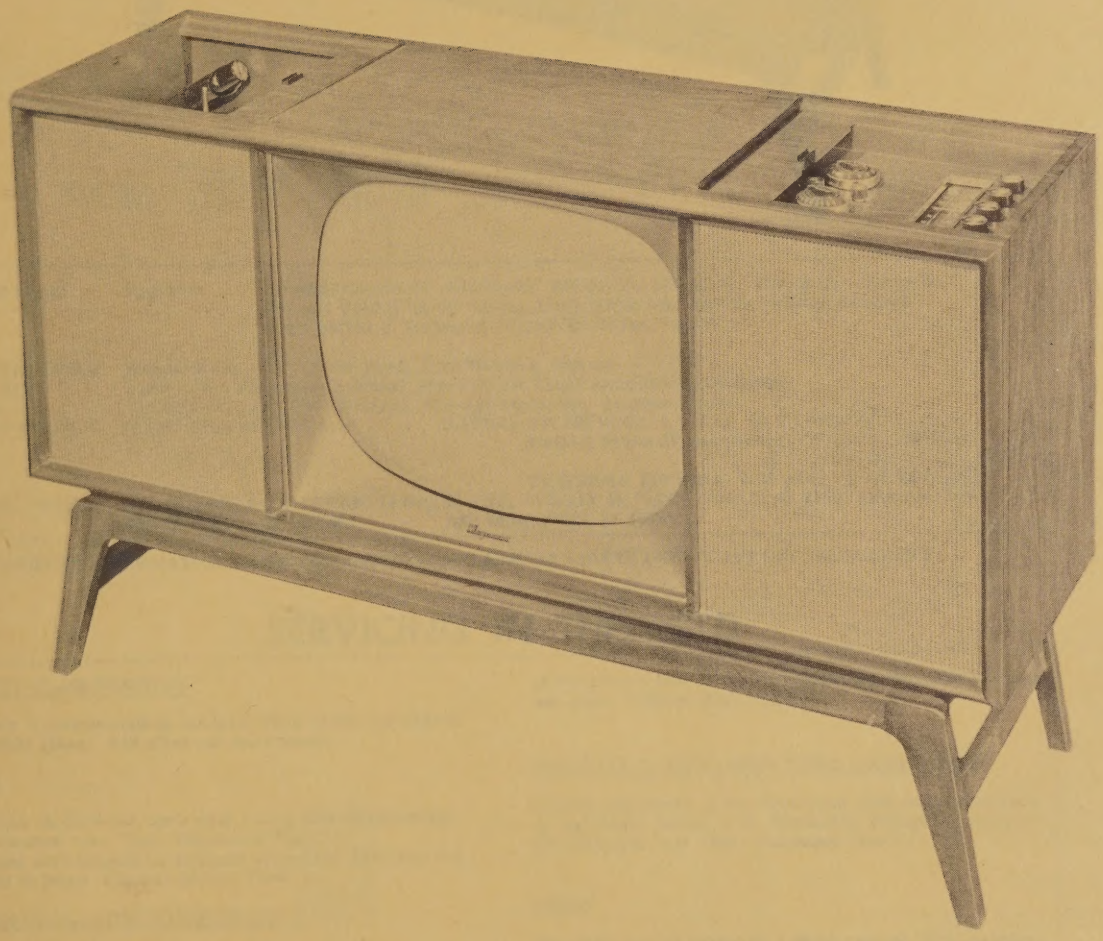
MAGNAVOX

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MAGNAVOX CHASSIS U30-15-00, V30-13-00 thru V30-17-00, AMP-196, 59-00-00 thru 59-03-00

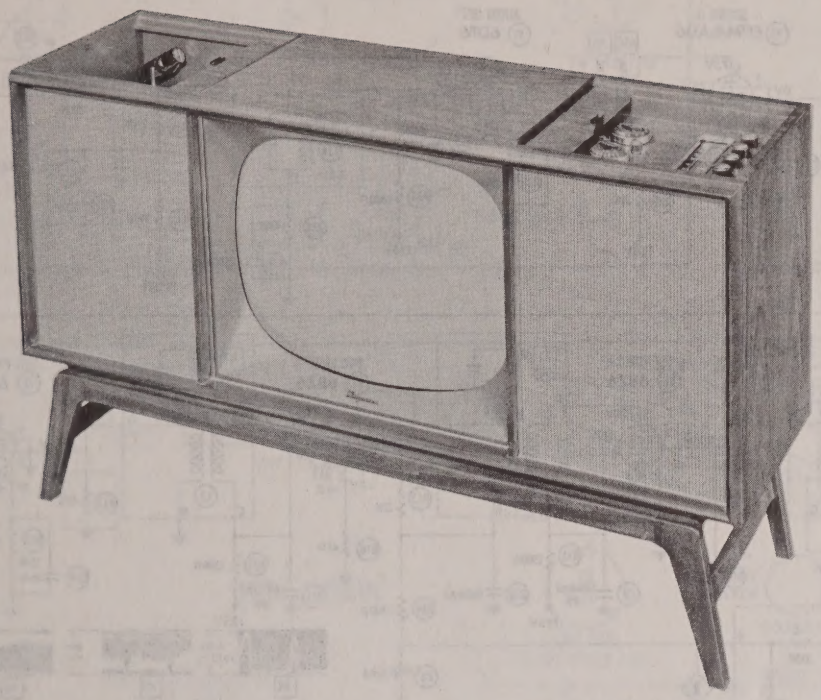


MAGNAVOX CHASSIS U30-15-00, V30-13-00 thru V30-17-00, AMP-196, 59-00-00 thru 59-03-00

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

MAGNAVOX CHASSIS U30-15-00, V30-13-00 thru V30-17-00, AMP-196, 59-00-00 thru 59-03-00



TRADE NAME	Magnavox	CHASSIS U30-15-00, V30-13-00, V30-14-00, V30-15-00, V30-16-00, V30-17-00, FM-AM TUNER 59-00, 59-01, AMPLIFIER AMP-196-00, POWER TUNING UNIT 700769-2, REMOTE CONTROL 700781, 700782 †
MANUFACTURER	Magnavox Co., 2131 Bueter Road, Fort Wayne 4, Indiana	
TYPE SET	Combination Television Receiver With FM-AM Tuner And Stereo Phonograph	
TUBES	TV: UHF-Twenty, VHF-Nineteen, FM-AM Tuner-Six, Amplifier-Four	
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING TV: 190 Watts, 1.8 Amp. @ 117 Volts AC Radio & Phono (Without Motor) 100 Watts, .95 Amp. @ 117 Volts AC TV & Radio 290 Watts, 2.75 Amp. @ 117 Volts AC
TUNING RANGE	TV: Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier) FM: 88-108MC, IF 10.7MC	AM: 540-1620KC, IF 455KC

† FOR SERVICE INFORMATION ON RECORD CHANGER SEE SIMILAR UNIT IN PHOTOFACT SET 342 FOLDER 3.

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Remove 4 screws holding the trim strip at the top edge of the safety glass. Tilt glass out and remove.

FUSE

One fuse is used for horizontal sweep circuit protection. (For location, see "Tube Placement Chart".)
One fuse wire is used for filament protection. (For location, see M3 in photo "Chassis Bottom View".)

TUNER OSCILLATOR ADJUSTMENTS

To touch-up the VHF Oscillator, it is necessary to remove the rear cover. The adjustments are accessible thru a hole in the right side of the tuner rear cover as viewed from the rear of the tuner.

FOCUS

The focus may be varied by connecting the lead from pin 4 of the picture tube to various voltage points. (For location, see photo "Cabinet Rear View".)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

Coarse adjustment of the Horizontal Hold is accomplished by the proper setting of the Horizontal Frequency slug (B1). (For location, see "Tube Placement Chart".)

WIDTH

The width may be varied by a Width control. (For location, see "Tube Placement Chart".)

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

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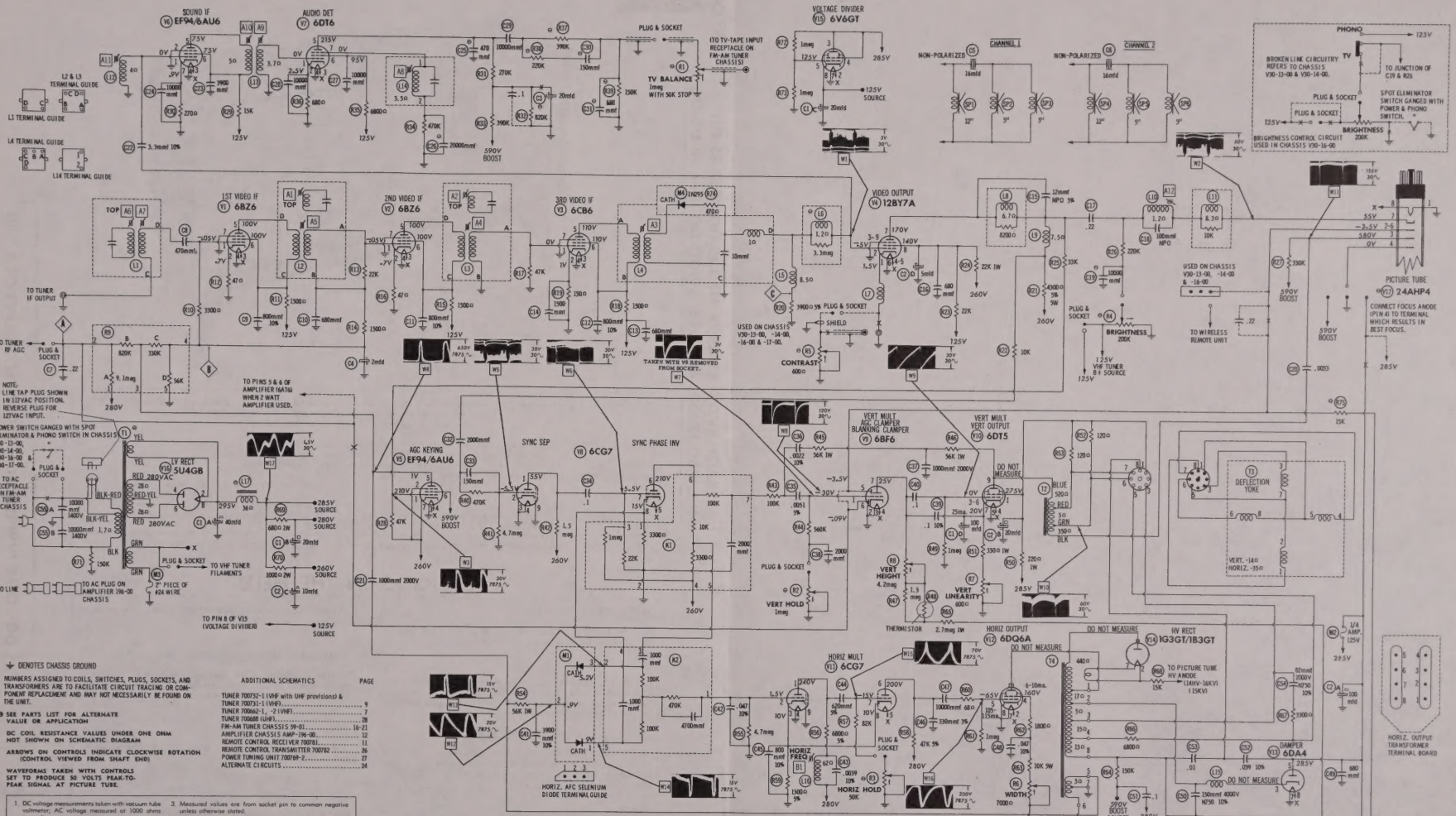
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

MAGNAVOX CHASSIS U30-15-00, V30-13-00 thru V30-17-00, AMP-196, 59-00-00 thru 59-03-00


SOUND IF V6 EF94/6AU6
AUDIO DET V7 6D6
VOLTAGE DIVIDER V15 6V6GT
TV BALANCE 1meg WITH 50K STOP
(TO TV-TAPE INPUT RECEPTACLE ON FM-AM TUNER CHASSIS)
PLUG & SOCKET
L2 & L3 TERMINAL GUIDE
L1 TERMINAL GUIDE
L4 TERMINAL GUIDE
L14 TERMINAL GUIDE
1ST VIDEO IF V1 6BZ6
2ND VIDEO IF V2 6BZ6
3RD VIDEO IF V3 6CB6
VIDEO OUTPUT V4 12BY7A
PHONO
BROKEN LINE CIRCUITRY REFERS TO CHASSIS V30-13-00 & V30-14-00.
TO JUNCTION OF C29 & R26
SPOT ELIMINATOR SWITCH GANGED WITH POWER & PHONO SWITCH.
BRIGHTNESS CONTROL CIRCUIT USED IN CHASSIS V30-16-00
BRIGHTNESS 200K
NON-POLARIZED
CHANNEL 1
CHANNEL 2
TO TUNER IF OUTPUT
TO TUNER RF AGC
TO PINS 5 & 6 OF AMPLIFIER (6AT6) WHEN 2 WATT AMPLIFIER USED.
NOTE: LINE TAP PLUG SHOWN IN 127VAC POSITION. REVERSE PLUG FOR 127VAC INPUT.
POWER SWITCH GANGED WITH SPOT ELIMINATOR & PHONO SWITCH IN CHASSIS V30-13-00, V30-14-00, V30-16-00 & V30-17-00.
TO AC RECEPTACLE ON FM-AM TUNER CHASSIS
LV RECT V10 5U4GB
TO AC PLUG ON AMPLIFIER 196-00 CHASSIS
2" PIECE OF #24 WIRE
TO LINE
TO VHF TUNER FILAMENTS
TO PIN 8 OF V15 (VOLTAGE DIVIDER)
AGC KEYING V5 EF94/6AU6
SYNC SEP V9 6CG7
SYNC PHASE INV
VERT MULT AGC CLAMPER BLANKING CLAMPER V9 6BF6
VERT MULT VERT OUTPUT V10 6DT5
DEFLECTION YOKE
VERT. -14Ω HORIZ. -35Ω
VERT HEIGHT 4.2meg
VERT LINEARITY 600Ω
THERMISTOR
HORIZ MULT V11 6CG7
HORIZ OUTPUT V12 6DQ6A
HV RECT V14 1G3GT/1B3GT
TO PICTURE TUBE HV ANODE (14HV-16KV) (15KV)
DAMPER V13 6DA4
HORIZ FREQ
HORIZ HOLD 50K
WIDTH 7000Ω
HORIZ. AFC SELENIUM DIODE TERMINAL GUIDE
HORIZ. OUTPUT TRANSFORMER TERMINAL BOARD
PICTURE TUBE V17 24AHP4
CONNECT FOCUS ANODE (PIN 4) TO TERMINAL WHICH RESULTS IN BEST FOCUS.
CONTRAST 600Ω
BRIGHTNESS 200K
TO WIRELESS REMOTE UNIT
USED ON CHASSIS V30-13-00, -14-00, -16-00 & -17-00.
TAKEN WITH V8 REMOVED FROM SOCKET.
VHF TUNER B+ SOURCE
590V BOOST
285V SOURCE
260V SOURCE
125V SOURCE
DO NOT MEASURE

⏚ DENOTES CHASSIS GROUND

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.

ADDITIONAL SCHEMATICS

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TUNER 700662-1, -2 (VHF)	7
TUNER 700688 (UHF)	28
FM-AM TUNER CHASSIS 59-01	16-21
AMPLIFIER CHASSIS AMP-196-00	12
REMOTE CONTROL RECEIVER 700781	11
REMOTE CONTROL TRANSMITTER 700782	26
POWER TUNING UNIT 700769-2	27
ALTERNATE CIRCUITS	24

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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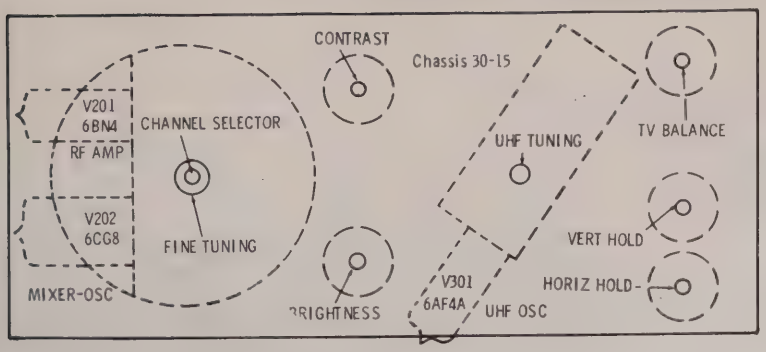
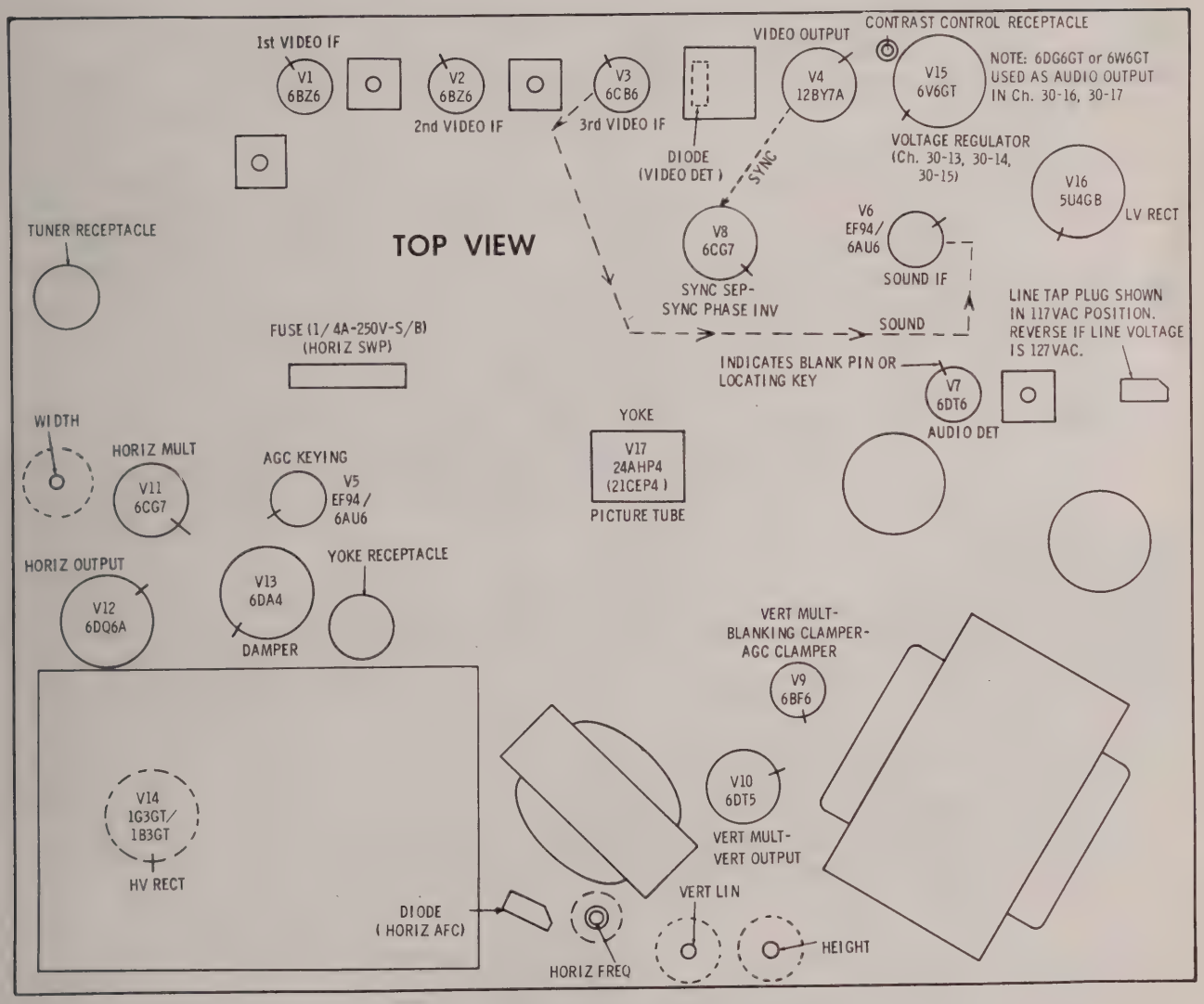
MAGNAVOX CHASSIS U30-15-00, V30-13-00 thru V30-17-00, AMP-196, 59-00-00 thru 59-03-00

MAGNAVOX CHASSIS U30-15-00, V30-13-00 thru V30-17-00, AMP-196, 59-00-00 thru 59-03-00

FOLDER 1

TUBE PLACEMENT CHART





TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound V16, Wire Fuse (Filament)

SWEEP FAILURE
No raster, has sound V11, V12, V13, V14, V17
No vertical deflection V9, V10
Poor vert. linearity or foldover V9, V10
Poor horiz. linearity or foldover V11, V12, V13
Narrow picture V16, V11, V12, V13
Vert. off freq. V9, V10
Horiz. off freq. V11, Diode (Horiz. AFC)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det.), V4, V17
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V17
Has pic, no sound V6, V7
Overloaded picture V5

SYNC FAILURE
No vert. sync V4, V8
No horiz. sync V4, V8
No vert. or horiz. sync V4, V8

MAGNAVOX CHASSIS U30-15-00, V30-13-00
thru V30-17-00, AMP-196, 59-00-00 thru 59-03-00

FOLDER 1

TV ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools:
Al thru Al2 ..... GENERAL CEMENT #8721, 8722
WALSCO #2519
Mixer Plate Coil. GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt bias supply to point Ⓐ. Positive to chassis.
Connect the negative lead of a 3 volt bias supply to point Ⓑ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Detune Mixer Plate Coil by turning core fully counterclockwise.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001mfd	High side to pin 1 (grid) of 1st Video IF. Low side to chassis.	43.0MC (10MC Swp)	47.25MC	Any non-interfering channel	Vert. Amp. thru 10K to point Ⓒ. Low side to chassis. (Across Video Det. load)	A1, A2	Adjust to place marker in trap notch as in Fig. 1. If two points are found to do this, use the one with the slugs farthest out of coils.
2.	"	"	"	42.25MC	"	"	A3, A4, A5	Adjust for maximum gain and symmetry of response similar to Fig. 2 with markers as shown. Adjust A3 for maximum gain, A4 to place 45.75MC marker at 50% on curve and A5 to place 42.25MC marker at 50% on other side. Recheck 47.25MC trap.
3.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	"	41.25MC	"	"	A6	Adjust to place 41.25MC marker in trap notch. If two points are found to do this, use the one with the slug farthest out.
4.	"	"	"	41.25MC 42.25MC 45.0MC 45.75MC	"	"	Mixer Plate Coil & A7	Adjust Mixer Plate Coil for maximum gain with 45.75MC marker at 50% as in Fig. 2. Adjust A7 for maximum gain and proper tilt. Repeat as necessary to obtain desired response. Recheck 41.25MC trap.

SOUND IF ALIGNMENT

Preset A8 for MINIMUM inductance.
Tune in a strong TV signal (preferably a tone signal or music). Adjust A8 just past the point of maximum sound with MINIMUM distortion.
Reduce the signal level by disconnecting the antenna leads or placing an adjustable attenuator pad across the terminals so that with the Volume set near maximum, sound is at a low level. Tune the Fine Tuning thru undistorted sound. Set the Fine Tuning at the verge of distortion.
Adjust A9, A10 and A11 for MINIMUM distortion.
Readjust the Fine Tuning as necessary during adjustment of A9, A10 and A11 to maintain the conditions described above.

4.5MC TRAP ALIGNMENT

Tune in a strong TV signal and turn the Fine Tuning slowly clockwise until 4.5MC beat interference becomes visible in the picture. Adjust A12 until the horizontal scanning lines are smooth and continuous.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 8
REMOTE CONTROL ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 26
AM-FM TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 17

FIG.1

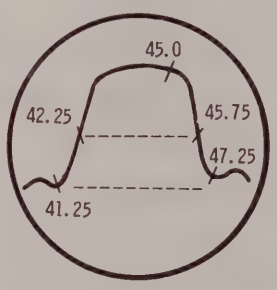
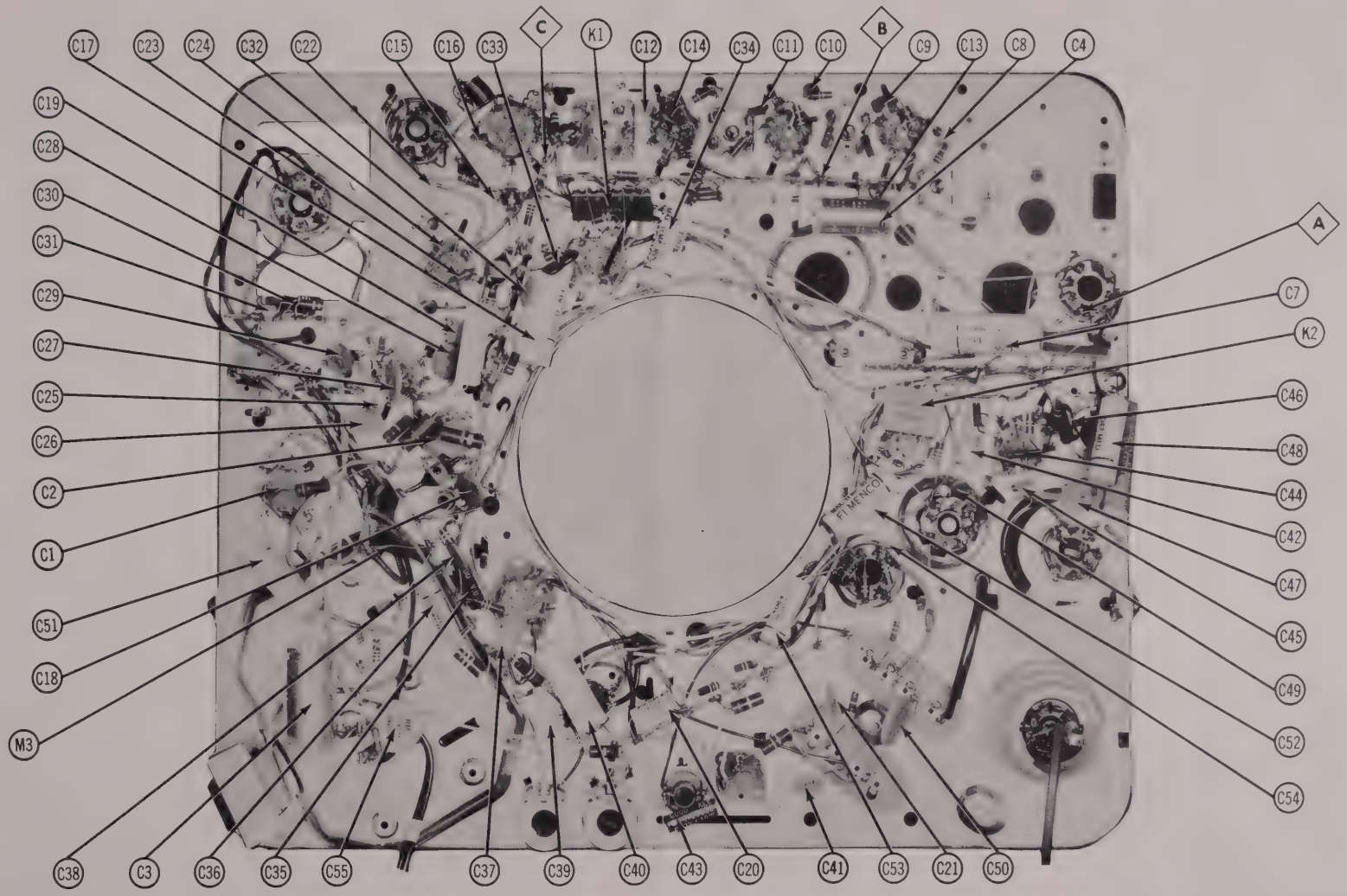
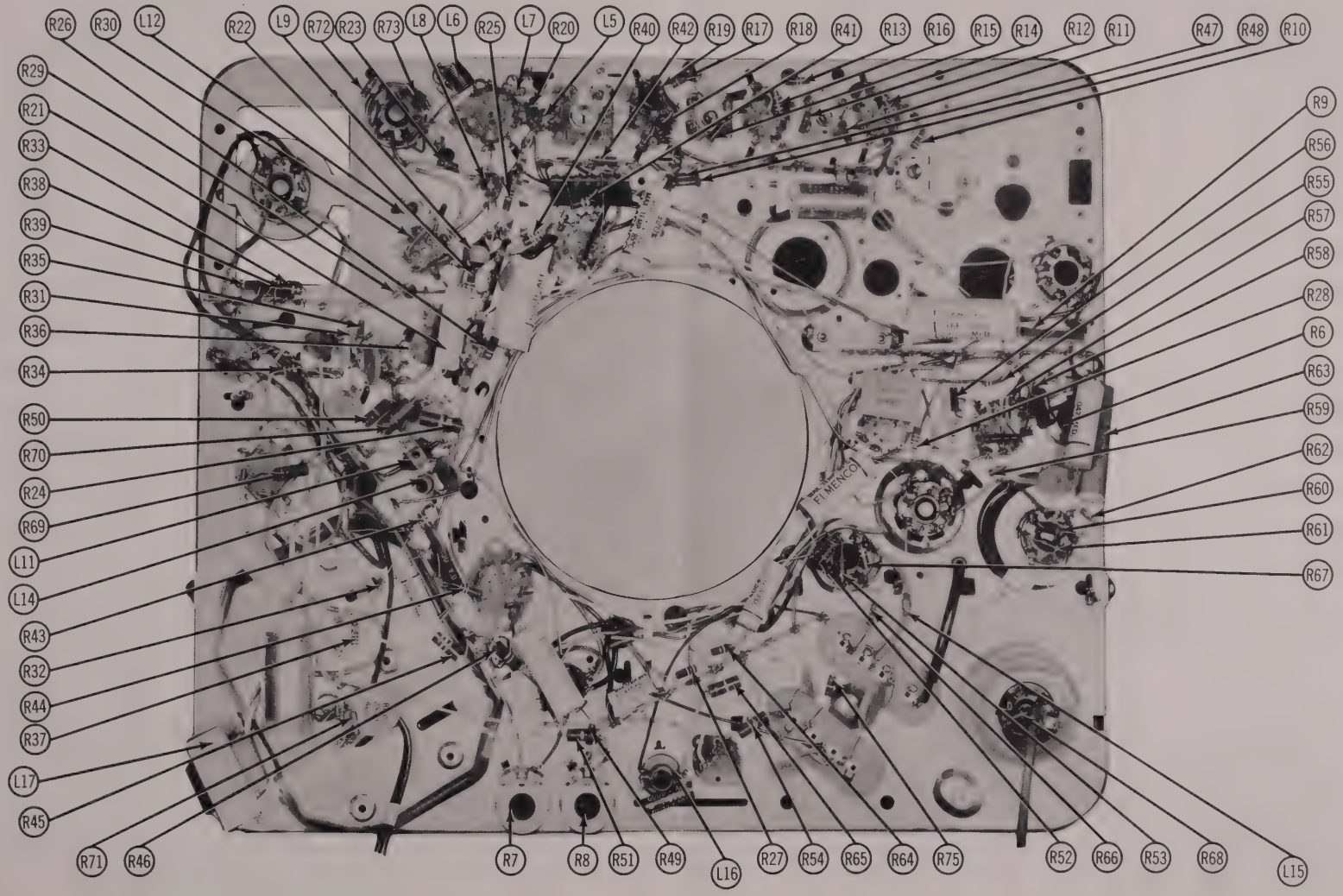


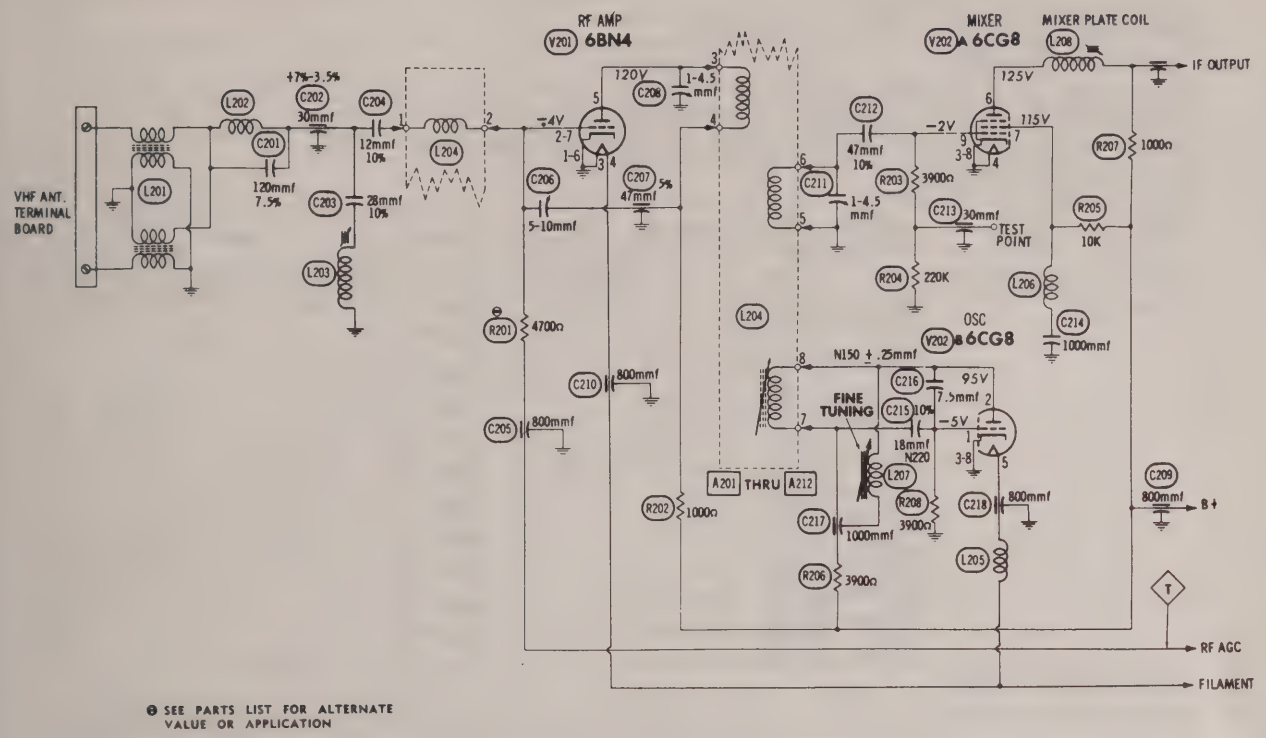
FIG.2



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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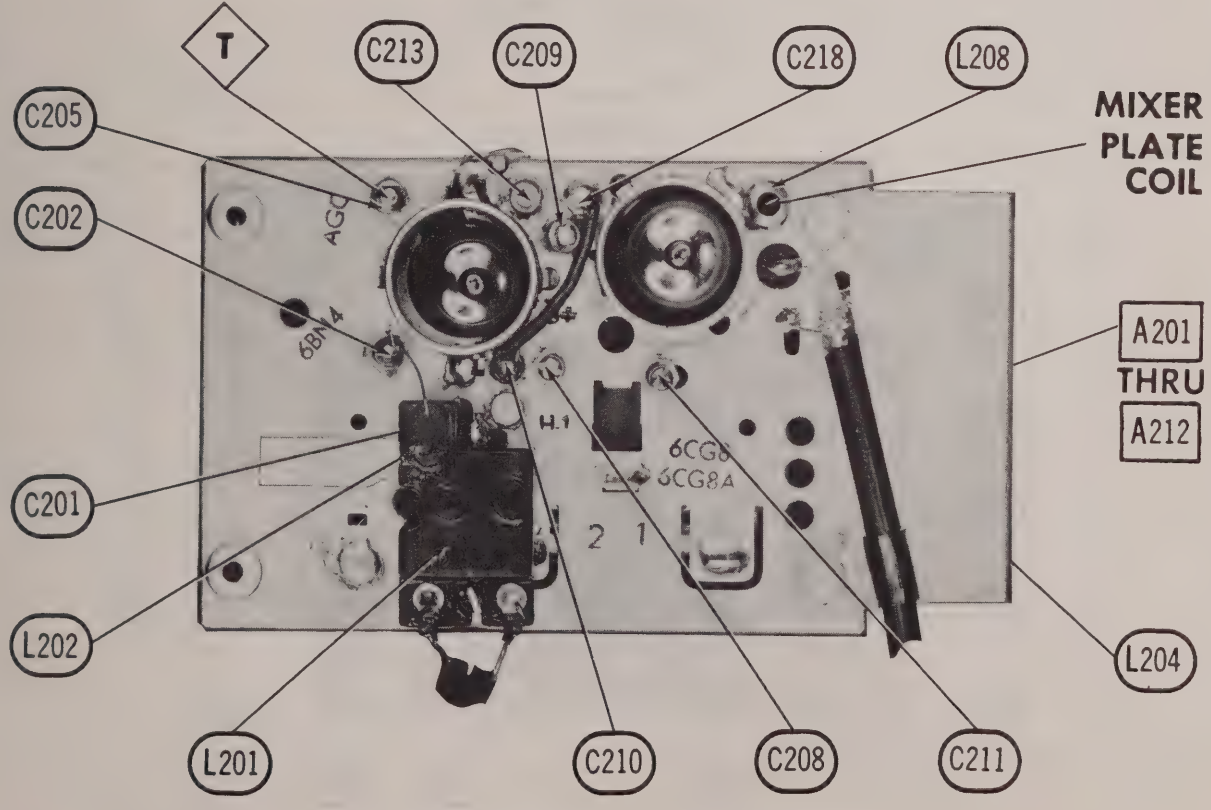
VHF TUNER 700662-1, -2



TUNER 700662-1 TOP VIEW

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLATOR ALIGNMENT

Connect the negative lead of a 1.5 volt bias supply to point Ⓣ. Positive to chassis.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The Sweep Generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough Sweep Generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Set the Fine Tuning to the center of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Detector load.	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A202	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A203	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A204	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A205	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A206	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A207	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A208	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A209	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A210	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A211	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A212	

VHF RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF TUNER

This protion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

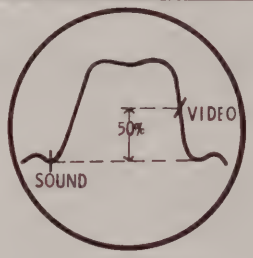
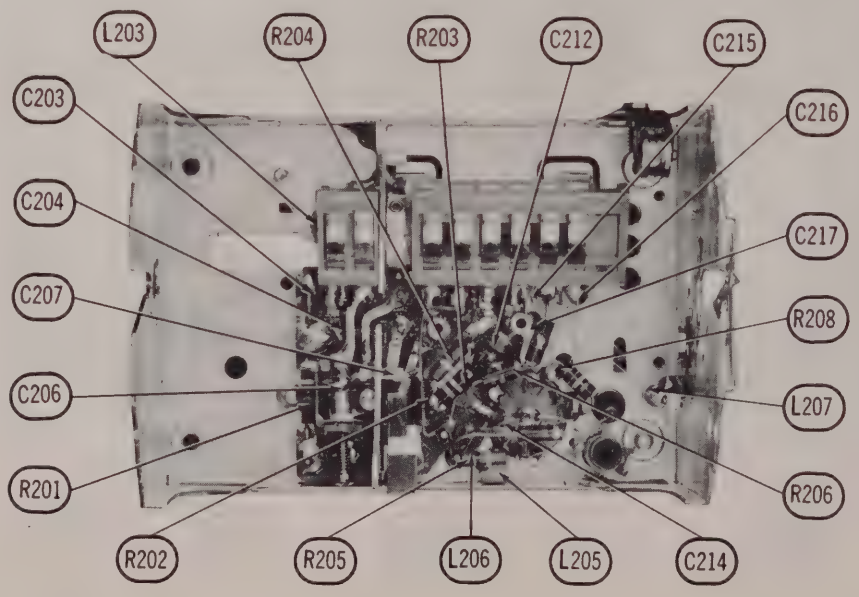
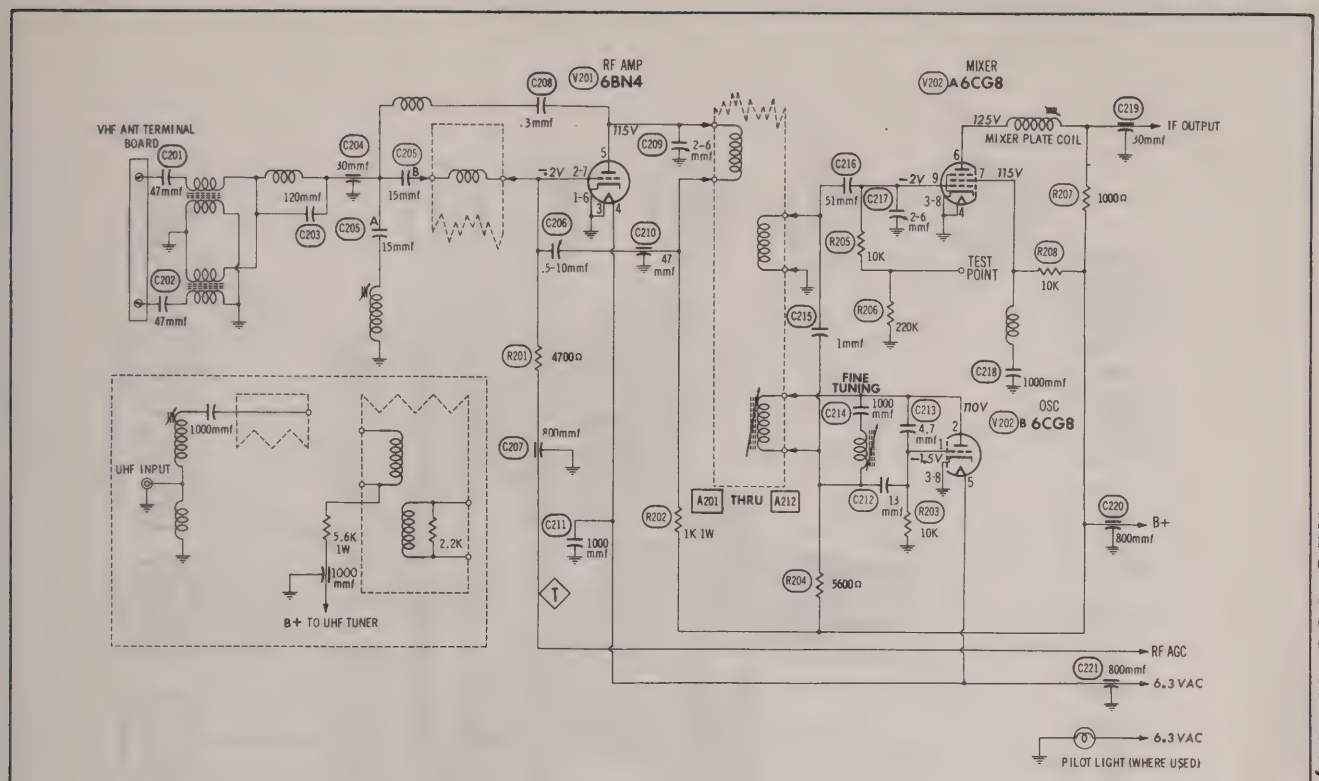


FIG. 201



TUNER 700662-1 BOTTOM VIEW



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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TUNER 700731-1, 700732-1

TUNER PARTS LIST AND DESCRIPTIONS

700731-1

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BN4	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6CG8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

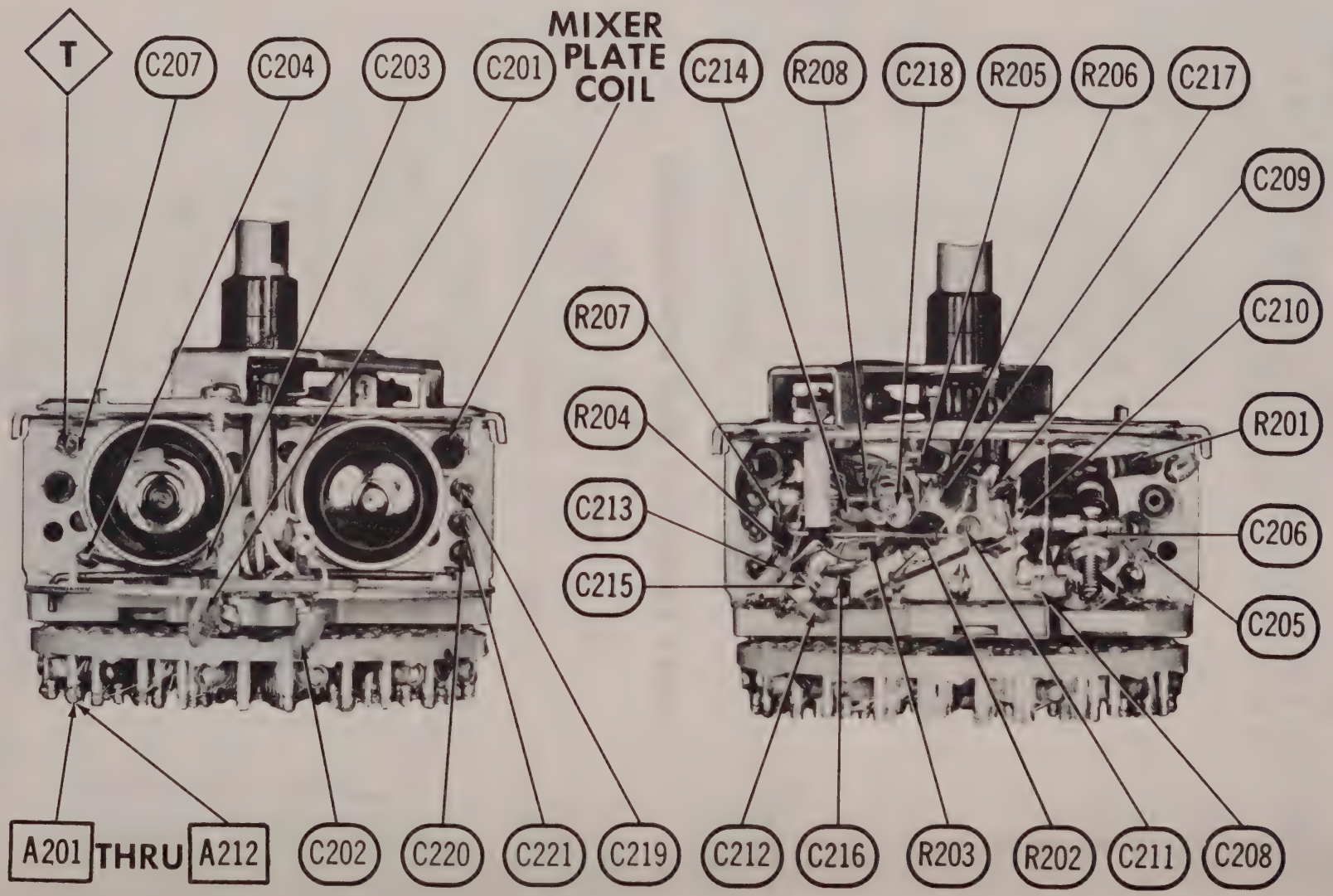
ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C201	47				BPD-000047	DD-470	L10Q47	CNO-447	5GA-Q47	
C202	47				BPD-000047	DD-470	L10Q47	CNO-447	5GA-Q47	
C203	120		10%		DI-120	DD-121	L10T12	CNO-312	5GA-T12S 10% *	
C204	30									
C205A	15				BPD-000015	DD-150	L10Q15	CNO-415	5GA-Q15	
B	15				BPD-000015	DD-150	L10Q15	CNO-415	5GA-Q15	
C206	.5-10					829-10				
C207	800				EF-001	MFT-1000			503C-D1	
C208	.3									
C209	2-6					829-6		CT552		
C210	47				EF-00005	MFT-50				
C211	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C212	13		N220 5%							
C213	4.7		N220 ± .25mmf							
C214	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C215	1.0				NPO-SI 1	TCZ-1		CNO-510	5TCCB-V1	
C216	51		N750 10%		N750-SI 51	TCN-51	C10Q51U			
C217	2-6					829-6		CT552		
C218	30									
C219	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C220	30									
C221	800				EF-001	MFT-1000			503C-D1	
C222	800				EF-001	MFT-1000			503C-D1	

RESISTORS

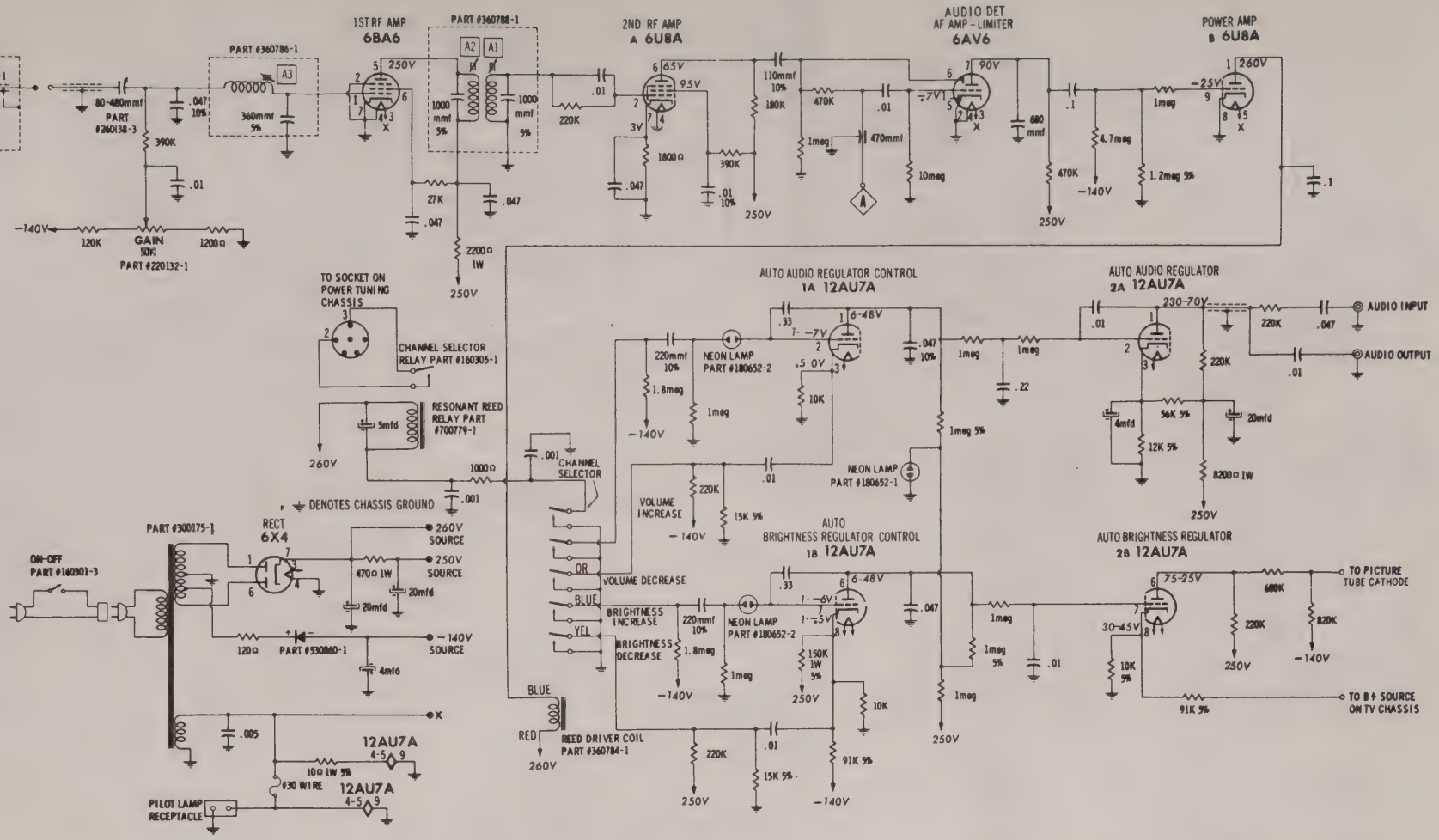
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	MAGNAVOX PART No.	NOTES
R201	4700Ω			
R202	1000Ω	1		
R203	10K			
R204	5600Ω			

ITEM No.	RATING OHMS	RATING WATT	MAGNAVOX PART No.	NOTES
R205	10K			
R206	220K			
R207	1000Ω			



TUNER 700731-1



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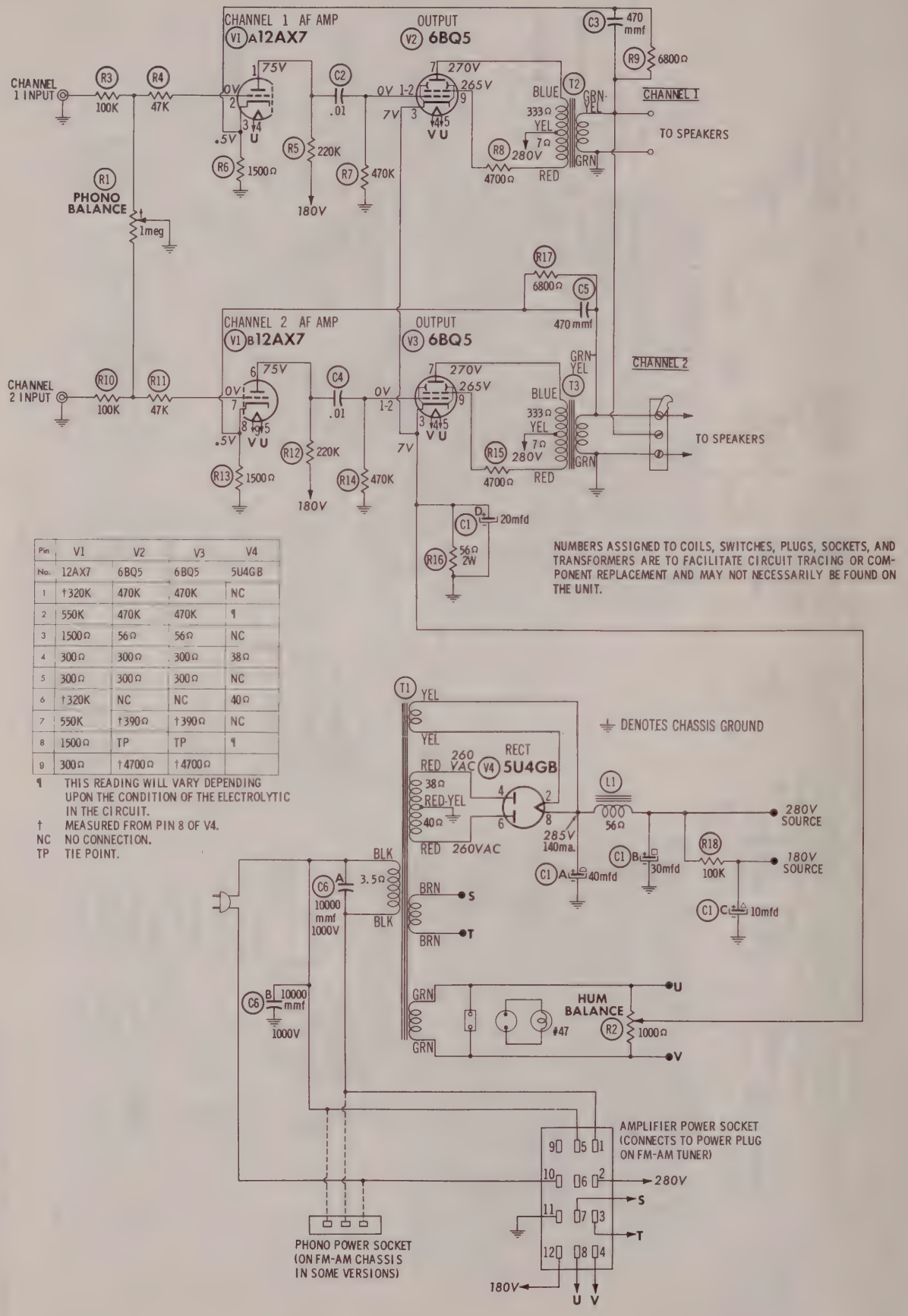
REMOTE CONTROL RECEIVER 700781

MAGNAVOX CHASSIS U30-15-00, V30-13-00 thru V30-17-00, AMP-196, 59-00-00 thru 59-03-00



Pin No.	V1 12AX7	V2 6BQ5	V3 6BQ5	V4 5U4GB
1	†320K	470K	470K	NC
2	550K	470K	470K	¶
3	1500Ω	56Ω	56Ω	NC
4	300Ω	300Ω	300Ω	38Ω
5	300Ω	300Ω	300Ω	NC
6	†320K	NC	NC	40Ω
7	550K	†390Ω	†390Ω	NC
8	1500Ω	TP	TP	¶
9	300Ω	†4700Ω	†4700Ω	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V4.
NC NO CONNECTION.
TP TIE POINT.

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AMPLIFIER CHASSIS AMP-196-00

AMP PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Channel 1 AF Amp. - Channel 2 AF Amp.	12AX7	
V2	Channel 1 Output	6BQ5	

ITEM No.	USE	TYPE	NOTES
V3	Channel 2 Output	6BQ5	
V4	Rectifier	5U4GB	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	270021-56	AFH4-78	D0640	FP429	TMQ-92	TVL-4734	
B	■30	450							
C	▲10	450							
D	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.01	400		250211-7	P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C3	470			250218-6	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C4	.01	400		250211-7	P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C5	470			250218-6	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C6A	10000	1000		250219-3	DAC-27	DD16-103	HVE16S1	UAC-2X110	5HK-2S1	
B	10000	1000			DAC-27	DD16-103	HVE16S1			

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	220154-5	AB-69	B47-1meg-S	B11-137	SU-54	Phono Balance
B	Shaft			AK-1	Not Req.	TM1	Not Req.	
R2A	1000Ω	½	220154-4	AB-5	B47-1000-S	B11-108	TA13L	Hum Balance
B	Shaft			AK-1	Not Req.	TM1	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MAGNAVOX PART No.	NOTES
	OHMS	WATT		
R3	100K		230104-86	
R4	47K		230104-82	
R5	220K		230104-90	
R6	1500Ω		230104-64	
R7	470K		230104-94	
R8	4700Ω		230104-70	
R9	6800Ω		230104-72	
R10	100K		230104-86	

ITEM No.	RATING		MAGNAVOX PART No.	NOTES
	OHMS	WATT		
R11	47K		230104-82	
R12	220K		230104-90	
R13	1500Ω		230104-64	
R14	470K		230104-94	
R15	4700Ω		230104-70	
R16	56Ω	2	230106-47	
R17	6800Ω		230104-72	
R18	100K		230104-86	

FILTER CHOKE

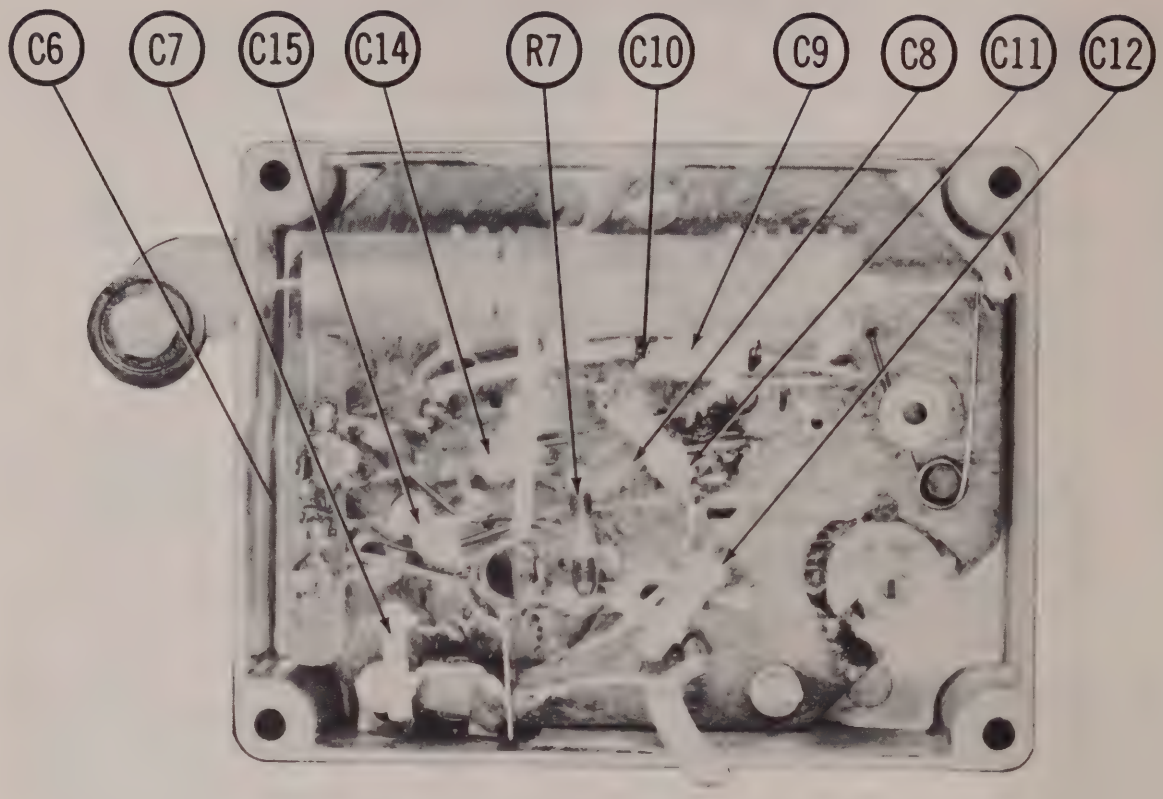
ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ∿)	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.140A	56Ω	1 Hy.	320041-2	26C41	C-2994	F-804	C-2327	26C41	C-24X

TRANSFORMER (POWER)

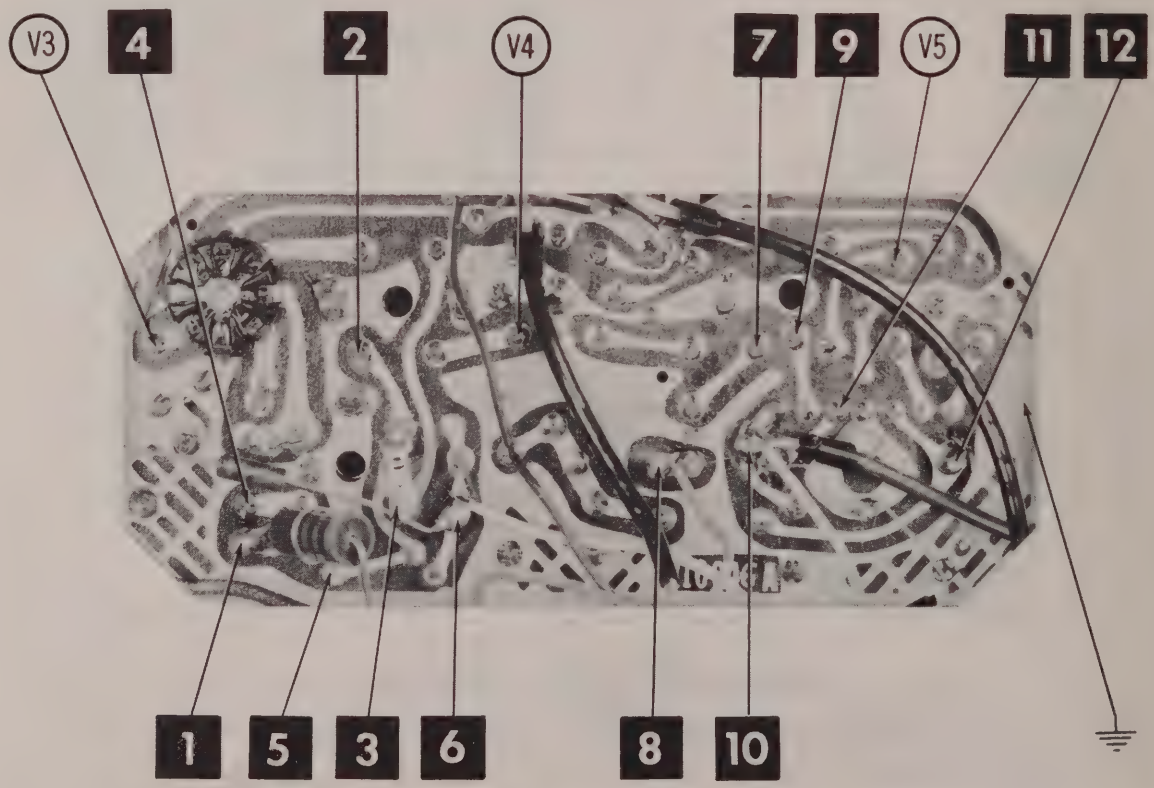
ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .95A	520VCT ⓐ .140A	5V ⓐ 3A	300177-1						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V ⓐ 2.3A	6.3V ⓐ 1.8A								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5000Ω tap ⓐ 5%	3-4Ω	320082-1	24S51A ①	A-3032 ①			24S51A ①		① Drill new mounting hole.
T3	5000Ω tap ⓐ 5%	3-4Ω	320082-1	24S51A ①	A-3032 ①			24S51A ①		



FM TUNER SUB CHASSIS



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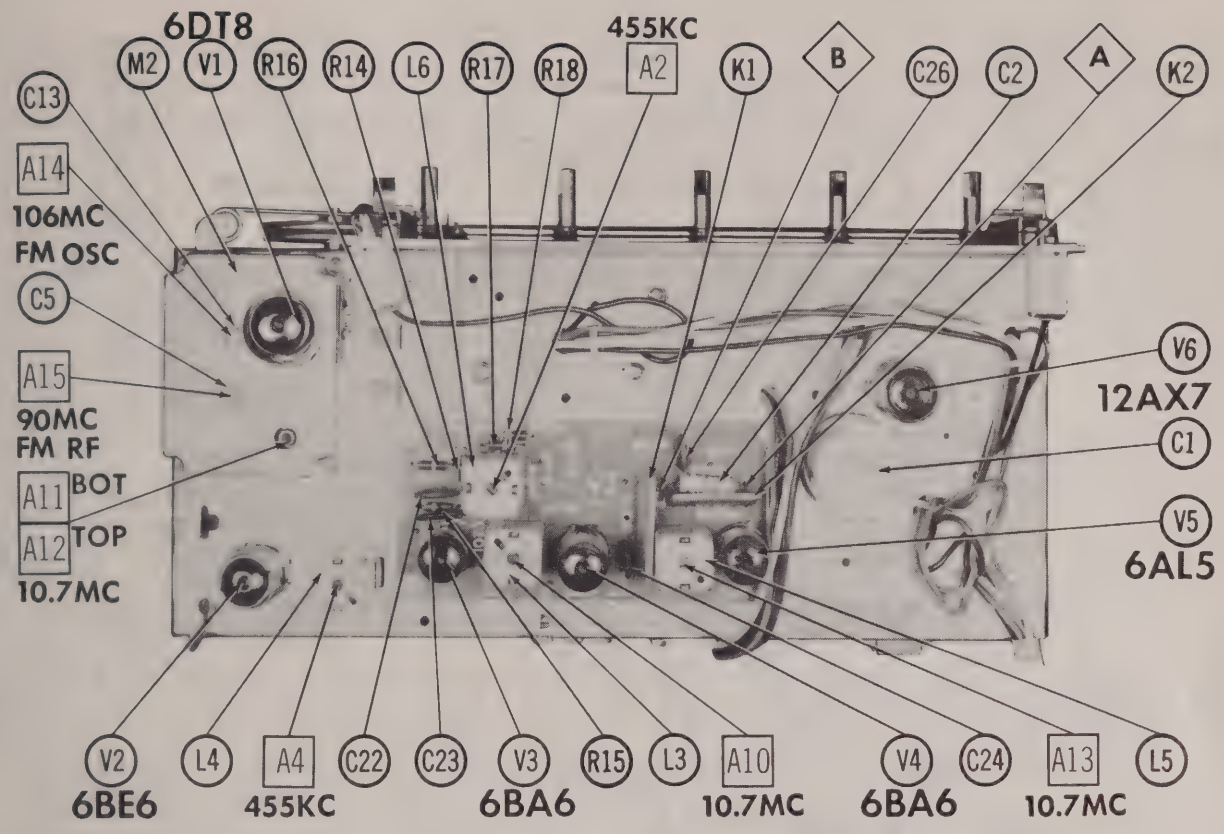
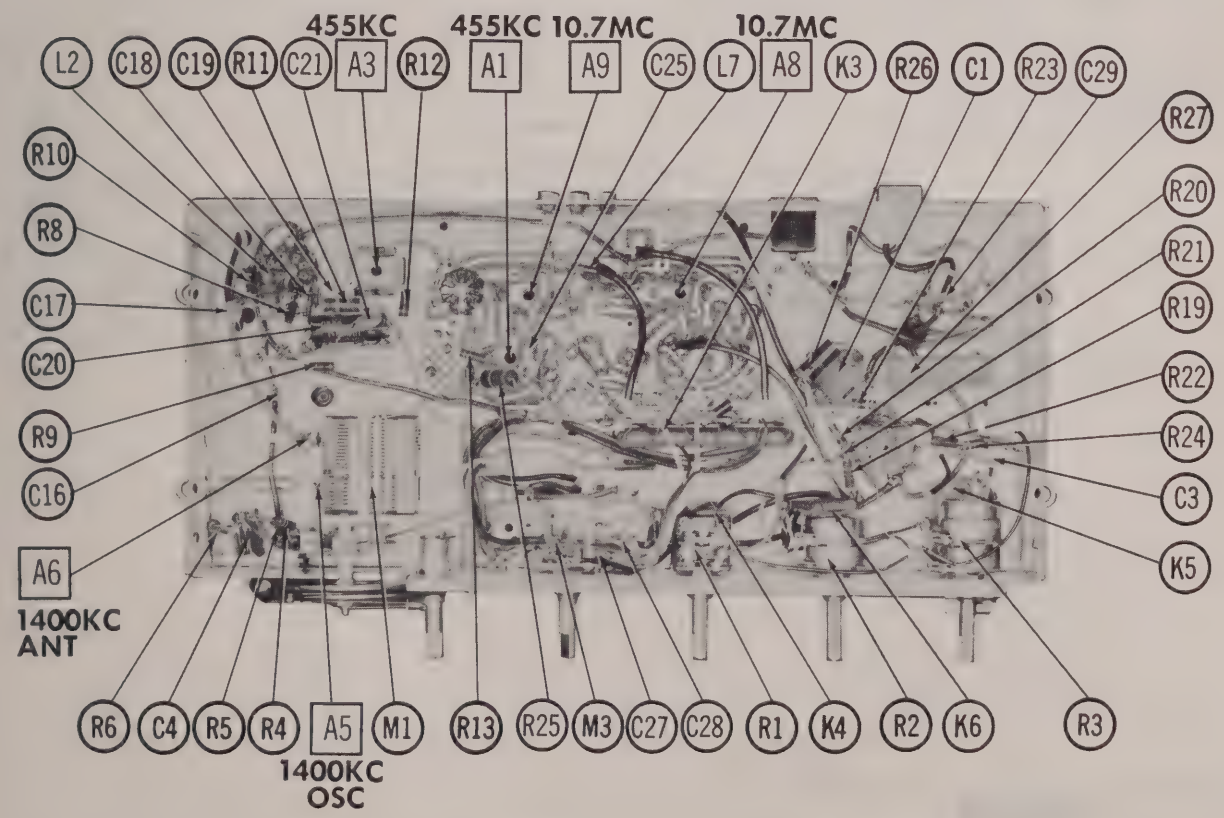
FM-AM IF
PRINTED BOARD

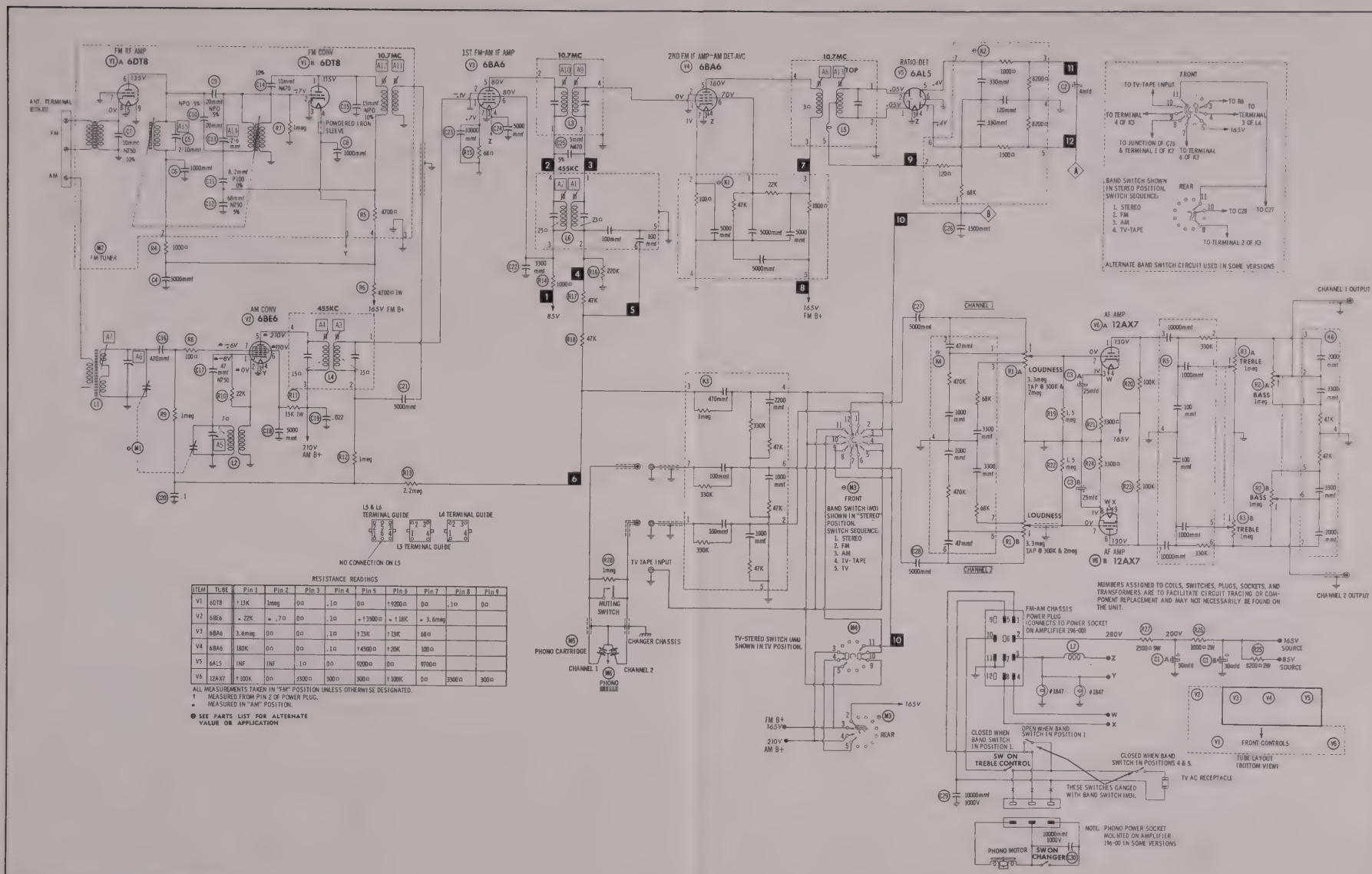
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



FM-AM CHASSIS 59-01 - TOP VIEW



FM-AM CHASSIS 59-01 - BOTTOM VIEW



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6DT8	↑13K	1meg	0Ω	.1Ω	0Ω	↑9200Ω	0Ω	.1Ω	0Ω
V2	6BE6	= 22K	= .7Ω	0Ω	.1Ω	= ↑350Ω	= ↑18K	= 3.6meg		
V3	6BA6	3.6meg	0Ω	0Ω	.1Ω	↑13K	↑13K	68Ω		
V4	6BA6	180K	0Ω	0Ω	.1Ω	↑4500Ω	↑20K	100Ω		
V5	6AL5	INF	INF	.1Ω	0Ω	9200Ω	0Ω	9700Ω		
V6	12AX7	↑100K	0Ω	3300Ω	300Ω	300Ω	↑100K	0Ω	3300Ω	300Ω

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
↑ MEASURED FROM PIN 2 OF POWER PLUG.
= MEASURED IN "AM" POSITION.
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

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FM-AM TUNER - CHASSIS 59-01

AM-FM TUNER ALIGNMENT INSTRUCTIONS

59-01

PRE-ALIGNMENT INSTRUCTIONS

Loudness control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
- A1 thru A4, A8, A9, A10, A13 ... GENERAL CEMENT #5004, 5008, 5009 WALSCO #2520
- A5, A6, A14, A15 ..... GENERAL CEMENT #5097, 8727 WALSCO #2515
- A11, A12 ..... GENERAL CEMENT #9440

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	High side to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400∿ Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	10mmf Ceramic Capacitor	High side to AM antenna terminal. Low side to chassis.	1400KC	"	1400KC	"	A5, A6	"
3.	"	"	600KC	"	600KC	"	A7	Adjust for maximum output. Repeat steps 2 and 3.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.		High side to an ungrounded tube shield floating over FM RF Amp. Low side to chassis.	10.7MC (Unmod)	FM	High Freq. end	DC probe thru 1 meg to point (A). Common to chassis.	A8, A9, A10, A11, A12	Adjust for maximum deflection.
5.		"	"	"	"	DC probe thru 1 meg to point (B). Common to chassis.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.		High side to ungrounded tube shield floating over FM RF Amp. Low side to chassis.	10.7MC (450KC swp)	FM	High Freq. end	Vert. Amp. thru 1meg to point (A). Low side to chassis.	A8, A9, A10, A11, A12	Disconnect stabilizing capacitor (C2). Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
5.		"	"	"	"	Vert. Amp. thru 1meg to point (B). Low side to chassis.	A13	Reconnect C2. Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines. Repeat steps 4 and 5.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.		High side to an ungrounded tube shield floating over FM RF Amp. Low side to chassis.	106MC (Unmod)	FM	106MC	DC probe thru 1meg to point (A). Common to chassis.	A14	Adjust for maximum deflection.
7.		"	90MC	"	90MC	"	A15	Adjust for maximum deflection. Repeat steps 6 and 7.

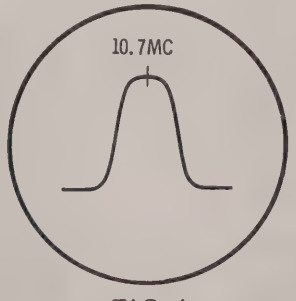


FIG. 1

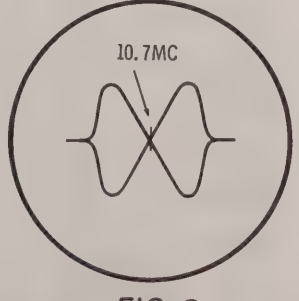


FIG. 2

MAGNAVOX CHASSIS U30-15-00, V30-13-00 thru V30-17-00, AMP-196, 59-00-00 thru 59-03-00

FOLDER 1

TV PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp.	6BZ6	
V2	2nd Video IF Amp.	6BZ6	
V3	3rd Video IF Amp.	6CB6	
V4	Video Output	12BY7A	
V5	AGC Keying	EF94/6AU6	
V6	Sound IF Amp.	EF94/6AU6	
V7	Audio Det.	6DT6	
V8	Sync Sep.-Sync Phase Inv.	6CG7	
V9	Vert. Mult. -Blanking Clamper-AGC Clamper	6BF6	
V10	Vert. Mult.-Vert. Output	6DT6	
V11	Horiz. Mult.	6CG7	
V12	Horiz. Output	6DQ6A	
V13	Damper	6DA4	
V14	HV Rect.	1G3GT/1B3GT	
V15	Voltage Regulator	5V6GT	
V16	LV Rect.	5U4GB	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	MAGNAVOX PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No.	
V17	24AEP4	24AEP4 ①	24AEP4 ①	24AEP4 ③	① Aluminized
	21CEP4	21CEP4 ①	21CEP4 ①	21CEP4/ 21CEP4A ③	③ Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA					NOTES
	CAP.	VOLT	MAGNAVOX PART No	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	40	350	270021-81	AFH4-05-70	C2372	FP456	TMQ-106	TVL-3815.6	
B	30	350			BR1005			TVA-1310	
C	30	300							
D	100	50							
C2A	100	350	270021-72	AFH4-07	D0044	FP389.1		TVL5-4635.9*	
B	20	350				TC60			
C	10	350							
D	5	350							
C3	30	350	270027-20	PR8450V20	BR2035	TC55	TD-20-350	TVA-1606	①
C4	3	50	270027-23	PR850V3	BR32-50	TC302	TD-3-50	TVA-1301	
C5	15	25NP	270040-4		BR3015 † BR3015 †	TCN2516			
C6	15	25NP	270040-4		BR3015 † BR3015 †	TCN2516			

① Not used in some versions. * Not normally in distributor's stock. Available thru distributor on order to manufacturer.
† Use 2 units. Connect negative terminals together. Connect positive terminals into circuit the same as the original non-polarized unit.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	CAP.	VOLT	TOL	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C7	.22	300		250203-15	P388N-22		CUB3P22	GEM-2022	2TM-P22	
C8	470			250218-6	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C9	800		10%	250218-4					5GA-T88 10% *	
C10	680			250218-1	BPD-00068	DD-681	BYA10T68	B-368	5GA-T68	
C11	800		10%	250218-14					5GA-T88 10% *	
C12	800		10%	250218-14					5GA-T88 10% *	
C13	680			250218-4	BPD-00068	DD-681	BYA10T68	B-368	5GA-T68	
C14	1500			250218-18	BPD-0015	DD-152	BYA10D15	B-152	5HK-D15	
C15	12		NPO 5%	250175-60		TCZ-12	L10Q12C	CNO-412	5TCC-Q12S 5% *	
C16	680			250218-4	BPD-00068	DD-681	BYA10T68	B-368	5GA-T68	
C17	22	400		250211-15	P488N-22		CUB4P22	GEM-4022	4TM-P22	
C18	100		NPO	250175-59	NPO-DI 100	DTZ-100	C10TIC	CNO-310	5TCC-T1	
C19	10000			250218-19	BPD-01	DD-103	BYA10SI	B-110	5HK-S1	①
C20	.0033	600		250201-4	P688N-0033	DD-332	CUB6D33	GEM-6333	6TM-D33	
C21	1000	3000		250218-31	HVD-30-1000	DD30-102	HVB30DI	2HV-210	30HK-D1	
C22	3.3		10%	250221-121	NPO-SI 3.3	TCZ-3R3	C10V33C	ZT-5533	5TCCB-V33S 10%	
C23	3900			250175-31	BPD-0039	DD-392	L10D39	JL-239	5GA-D39	
C24	10000			250218-19	BPD-01	DD-103	BYA10SI	B-110	5HK-S1	
C25	470			250218-6	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	②
C26	20000			250175-1	BPD-02	DD-203	BYB02SI	B-120	5HK-S2	③
C27	10000			250218-19	BPD-01	DD-103	BYA10SI	B-110	5HK-S1	
C28	10000			250218-19	BPD-01	DD-103	BYA10SI	B-110	5HK-S1	
C29	10000			250218-19	BPD-01	DD-103	BYA10SI	B-110	5HK-S1	
C30	150			250218-534	ADM-15-151	DD-151	2SR5T15	CNO-315	MS-315	④
C31	680			250218-4	BPD-00068	DD-681	BYA10T68	B-368	5GA-T68	④
C32	2000			250218-20	BPD-002	DD-202	BYA10D2	B-220	5HK-D2	
C33	150			250218-534	ADM-15-151	DD-151	2SR5T15	CNO-315	MS-315	
C34	.1	400		250211-13	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C35	.0051	600	5%	250277-118			1DR5D51		4TM-D51S 5% *	
C36	.0022	600	10%	250290-5	V84CSD22		PM6D22	GTM-6222	6TM-D22	
C37	1000	3000		250218-31	HVD-30-1000	DD30-102	HVB30DI	2HV-210	30GA-D1	
C38	2000			250218-20	BPD-002	DD-202	BYA10D2	B-220	5GA-D2	
C39	.1	400	10%	250212-5	V84C4P1		PM4P1	GTM-401	4TM-P1	
C40	.1	400		250211-13	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C41	3900		10%	250218-32	DH-3900 10%			JL-239	5GA-D39S 10% *	
C42	.047	200	10%	250212-5	V84C2847		PM2S47	GTM-2147	2TM-S47	
C43	.0039	200	10%	250294-113				JL-239	5SF-D39	
C44	120		5%	250229-349	ADM-15-621		1R5T62		MS-362	
C45	800		10%	250218-14					5GA-T88 10% *	
C46	330		5%	250229-342	ADM-15-331		5R5T33 5%		MS-3336 5% *	
C47	10000			250218-19	BPD-01	DD-103	BYA10SI	B-110	5HK-S1	
C48	.047	400	10%	250211-11	V84C-4847		PM4S47	GTM-4147	4TM-S47	
C49	680			250218-4	BPD-00068	DD-681	BYA10T68	B-368	5GA-T68	
C50	150	4000	N750 10%	250175-59						
C51	.1	400		250211-13	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C52	.039	600	10%	250290-3	P64CM-039				6TM-S396 *	
C53	.01	600		250290-4	P688N-01	DD-103	CUB6SI	GEM-611	6TM-SI	
C54	82	2000	N750 10%	250175-70						
C55A	10000	1400		250219-3	DAC-27	DD16-103	HVE16SI	2HV-120	20HK8-S2	
B	10000	1400			DAC-27	DD16-103	HVE16SI	2HV-110	20HK8-S1	

① Ch. 30-13, 30-14 use 20000mmf in this application (Part #250175-71).
② Ch. 30-13, 30-14 use 230mmf in this application (Part #250218-5).
③ Ch. 30-13, 30-14 use .047mfd @ 200V in this application (Part #250302-11).
④ See alternate schematic for circuit variations and values.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No	RATING		REPLACEMENT DATA						INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No	MALLORY PART No		
R1A	1meg	½	230146-17	AB-744 *	B47-1meg-Z*	B13-137 *	TA16A *		TV Balance, Stop ⑥ 50K . ①
B	Shaft			AK-1	Not Req.	TMI	Not Req.		
A	1meg	½	230135-1				PP16A		Volume, ②
B	Switch						Not Req.		Push-Pull Off-On
R2A	1meg	½	230146-14	BX-69	B47-1meg-S	B11-137	PTA1241L		Vert. Hold, ③
B	Shaft			Not Req.	Not Req.	TMI	Not Req.		
A	1meg	½	230146-17	AB-744 *	B47-1meg-Z*	B13-137 *	TA16A *		Vert. Hold, ④
B	Shaft			AK-1	Not Req.	TMI	Not Req.		
R3A	50K	½	230146-9	BX-31	B47-50K-S	B11-133	PTA54L		Horiz. Hold, ③
B	Shaft			Not Req.	Not Req.	TMI	Not Req.		
R4A	200K	½	230126-75	B-46	A47-200K-S	Q11-139	U43		Brightness, ⑤
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.		
A	200K	½	230146-10	BX-45	B47-200K-S	Q11-139	U43		Brightness, ⑤
R5A	600Ω	½	230126-73	B-415	A47-750-S	Q17-106	U3		Contrast, ③
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.		
A	600Ω	½	230126-71	B-415	A47-750-S	Q17-106	U3		Contrast, ②
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.		
R6A	70000Ω	½	230146-18	AB-13	B47-10K-S	B11-115	TA14L		Width
B	Shaft			AK-1	Not Req.	TMI	Not Req.		
R7A	600Ω	½	230146-13	AB-4	B47-750-S	B11-105	PTA52L		Vert. Lin.
B	Shaft			AK-1	Not Req.	TMI	Not Req.		
R8A	4.2meg	½	230146-16	AB-86	B47-5meg-S	B11-104	PTA56L		Vert. Height
B	Shaft			AK-1	Not Req.	TMI	Not Req.		

① Ch. 30-13, 30-14 use 3.3meg, Loudness, (Part #230131-17).
② Used in Ch. 30-16, 30-17.
③ Ch. 30-13 uses 50K, Horiz. Hold ; 1meg, Vert. Hold (dual), (Part #230149-5).
④ May be used in some versions of Ch. 30-15.
⑤ Ch. 30-13 uses 200K, Brightness; 600Ω, Contrast (dual), (Part #230149-6). Ch. 30-16 uses 200K, Brightness with Switch (Part #230135-7).
⑥ Used in Ch. 30-14, 30-17.
* Use 50K resistor in series with left hand terminal.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MAGNAVOX PART No.	NOTES
	OHMS	WATT		
R9A	9.1meg			
B	820K		250296-1	
C	330K			
D	56K			
R10	3300Ω		231044-88	
R11	1500Ω		231004-64	
R12	470		230104-46	
R13	22K		231044-78	
R14	1500Ω		231004-64	
R15	1500Ω		231004-64	
R16	470		230104-46	
R17	47K		231044-23	
R18	1500Ω		231004-64	
R19	150Ω		231004-52	
R20	3900Ω 5%		231094-173	
R21	43000Ω 5%	5	240076-23	
R22	10K		230104-74	
R23	22K		231004-78	
R24	22K	1	231015-78	
R25	33K		231004-80	
R26	220K		231004-90	
R27	330K		231004-92	
R28	47K		231004-82	
R29	15K		231004-76	
R30	270Ω		231052-18	
R31	270K		231052-54	
R32	820K		231004-97	
R33	390K		231004-93	
R34	470K		231004-94	
R35	6800Ω		231004-72	
R36	680Ω		231004-60	
R37	390K		231004-93	Note 1
R38	220K		231004-90	Note 1
R39	150K		231004-88	Note 1
R40	470K		231004-94	Note 1
R41	4.7meg		231014-106	
R42	1.5meg		231014-100	
R43	100K		231014-86	
R44	560K		231044-95	
R45	56K	1	231015-83	
R46	56K	1	231015-83	
R47	1.5meg		231014-100	
R48			230130-2	Note 2
R49	1meg		231014-98	
R50	220Ω	1	231015-54	
R51	330Ω	1	231015-56	
R52	120Ω		231014-51	
R53	120Ω		231014-51	
R54	56K	1	231015-83	
R55	4.7meg		231014-106	
R56	68000 5%		231094-179	
R57	82K		231014-85	
R58	47K 5%		231094-199	
R59	13000 5%		231094-162	
R60	68Ω		231014-72	
R61	1meg		231014-98	
R62	1800Ω		231014-65	
R63	10K	5	231014-74	
R64	150K		231014-88	
R65	2.7meg	1	231015-103	
R66	6800Ω		231014-72	
R67	3300Ω		231014-68	
R68	15K		231014-76	
R69	680Ω	1	231015-60	
R70	1000Ω	2	231016-62	
R71	150K		230110-2	
R72	1meg		231014-98	
R73	1meg		231014-98	
R74	470Ω			
R75	15K		231014-76	Note 3

Note 1. See alternate schematic for circuit variations and values.
Note 2. Temperature compensating.
Note 3. Ch. 30-13, 30-14, 30-16 use 6800Ω in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		MAGNAVOX PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1A	1st Video IF	360654-1						
B	41.25MC Trap							
L2A	2nd Video IF	360644-1	17-5003 *	17-5003 *	TV-128 *	6233 *		
B	47.25MC Trap							
L3A	3rd Video IF	360644-1	17-5003 *	17-5003 *	TV-128 *	6233 *		
B	47.25MC Trap							
L4	4th Video IF	360643-1	17-4514	17-4514				
L5	Shunt Peaking Coil	360622-16	19-3300	19-3300	TV-198	6130	VP-6	278uh
L6	RF Choke							6uh ①
L7	Cathode Choke	360630-1	19-1001	19-1001	BC-563	4604	VP-2	1.65uh
L8	Series Peaking Coil	360622-14	19-3075 ▲	19-3075 ▲	TV-185	6172 ▲	VP-2 ▲	75uh ②
L9	Shunt Peaking Coil	360622-9	19-3250	19-3250	TV-186	6181	VP-6	235uh
L10	4.5MC Trap	360714-1						
L11	Series Peaking Coil	360622-13	19-3100 ■	19-3100 ■	TV-194 ■	6113 ■	VP-3 ■	100uh ③
L12	1st Sound IF	360772-1	17-3402	17-3402	TV-119 ▲	1470 ▲	SF-3	
L13	2nd Sound IF	360715-1			TV-149 +			
L14	Quadrature Coil	360716-2	17-1031 †	17-1031 †	TV-134 †	1481 †	SD-5	
L15	RF Choke	360783-1						

* Use adapter plate.
▲ Parallel with 82000 resistor.
■ Parallel with 10K resistor.
= Disregard tap.
† Drill mounting holes.
+ Enlarge mounting hole.

① Wound on 3.3meg resistor. Some versions may use Coil #360443-23 without resistor.
② Wound on 82000 resistor.
③ Wound on 10K resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI	SEC	MAGNAVOX PART No	Halldorson PART No	Merit PART No	Miller PART No	Ram PART No	Thordarson PART No		
L16	62Ω		360579-2	HS-5	TV-163	6210	H-102	HS-5		Horiz Stab

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT (1000 ^)	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
L17	. 280A	36Ω	85y.	320078-1 ①						C-27X ③

① Alternate Part #320078-2 used in Ch. 30-15, 30-16, 30-17. Ch. 30-13, 30-14 use Part #320290-1.
② Use original frame.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
T1	127V tap @ 117V @ 1.8A	560VCT @ .260A	5V @ 3A	300171-1 ①						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ 9.3A									

① Used in Ch. 30-15, 30-16, 30-17. Ch. 30-13, 30-14 use Part #300178-1.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert. Output	320078-1							
T3	Yoke-Horiz. (15.8MH) (20^)-Vert. (35MH)	700747-1	Y-52 (1)(2)		Y-110 (1)(2)		DY-27A (1)(2)	Y-52 (1)(2)	Y-60 (2) YC-110
	Rear Cover & Centering Device	360755-1							
T4	Horiz. Output	360778-1							

① Remove horizontal and vertical damping networks from yoke, and use original rear cover.
② Connect yoke terminal #2 to yoke plug pin #2, yoke terminals #4 and #3 to yoke plug pin #6, yoke terminal #7 to yoke plug pin #8.
③ Connect yoke terminal #2 to yoke plug pin #3, yoke terminals #4 and #3 to yoke plug pin #6, yoke terminal #10 to yoke plug pin #8.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MAGNAVOX PART No.	QUAM PART No.	
SP1	12"	PM	3-4Ω	584045	12A31	
SP2	5"	PM	3-4Ω	580038-1	5A07	
SP3	5"	PM	3-4Ω	580038-1	5A07	
SP4	12"	PM	3-4Ω	584045	12A31	
SP5	5"	PM	3-4Ω	580038-1	5A07	
SP6	5"	PM	3-4Ω	580038-1	5A07	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MAGNAVOX PART No.	REPLACEMENT DATA
K1	Sync Separator	2000mmf, 3300Ω, 3300Ω, 10K 22K, 100K, 1meg	250303-1	
K2	Horiz. AFC	1000mmf, 1000mmf, 4700mmf, 100K, 100K, 470K	250298-1	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	MAGNAVOX PART No	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1		530045-3 ①	K1616 ①	1T1 ① ②			① Selenium Type ② Two required

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MAGNAVOX PART No		LITTELFUSE PART No		BUSS PART No	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	1/4A 125V 8/9	180157-30		312.250 (3AG-1/4A-8/9)	357001	MDL 1/4	4405
M3	2" Length #24 Wire							

MAGNAVOX CHASSIS U30-15-00, V30-13-00 thru V30-17-00, AMP-196, 59-00-00 thru 59-03-00

FOLDER 1

TV PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

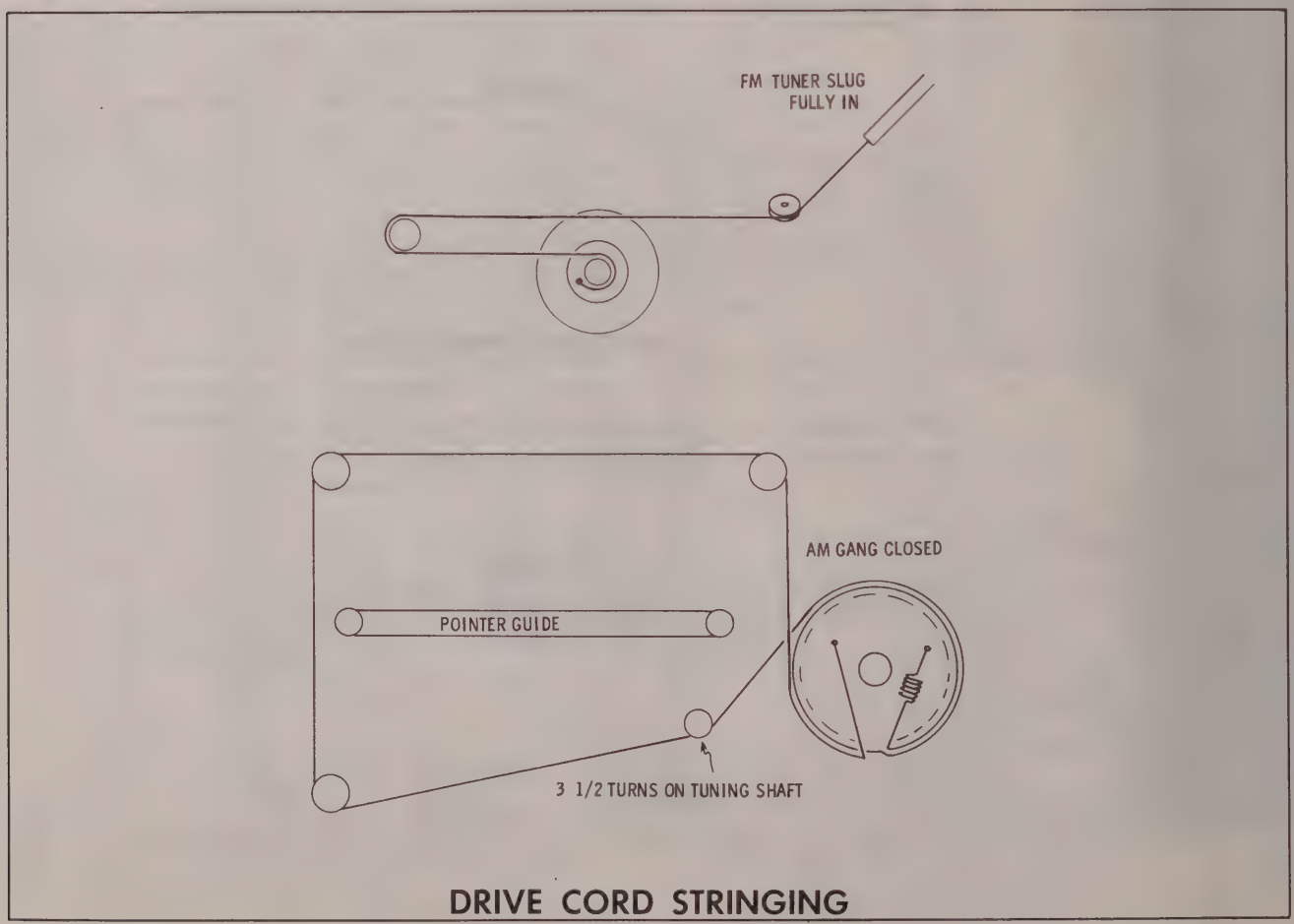
ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MAGNAVOX PART No.	CBS PART No.	SYLVANIA PART No.	
M4	1N295		1N60	1N295	Video Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M5	Tuner	700732-1	VHF with UHF provisions Ch. U30-15
	Tuner	700731-1	VHF Ch. V30-15
	Tuner	700662-1	VHF Ch. V30-13, V30-14, V30-16, V30-17
	Tuner	700662-2	VHF Ch. V30-13, V30-14, V30-16, V30-17
M6	Tuner	700668	UHF
	Switch	180292-5	Off-TV-Phono, Ch. 30-13, 30-14

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor



DRIVE CORD STRINGING

FM-AM TUNER PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amplifier-FM Converter	6DT8	
V2	AM Converter	6BE6	
V3	1st FM-AM IF Amplifier	6BA6	
V4	2nd FM IF Amplifier-AM Detector-AVC	6BA6	
V5	Ratio Detector	6AL5	
V6	Channel 1 AF Amp.-Channel 2 AF Amp.	12AX7	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲30	450	270021-58	AFH2-54	B0430	FP237	TMD-52	TVL-2759	
B	▲30	450							
C2	4	50	270559-9	PWE50005	EC5-50	TT50X4	ML4-50	TE-1302.1	
C3A	25	25	270043-1	PRS25V20-20	BBR25-25	TCD26	TD-25-25	TVA-1205	
B	25	25			BBR25-25		TD-25-25	TVA-1205	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	5000			250175-30	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C5	2-10			250306-1						
C6	1000			250314-1	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C7	10		N750 10%	250313-1	N750-SI 10	TCN-10	C10Q1U	NT-541	5TCU-Q1S 10% *	
C8	1000			250314-1	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C9	20		NPO 5%	250309-1		TCZ-20	C10Q2C		5TCC-Q2S 5% *	
C10	20		NPO 5%	250309-1		TCZ-20	C10Q2C		5TCC-Q2S 5% *	
C11	8.2		P100 0%	250310-1						
C12	68		N750 5%	250308-1		TCN-68	C10Q68U	CN7-468	5TCU-Q68S 5% *	
C13	2-6			250307-1						
C14	10		N470 10%	250312-1						
C15	15		NPO 10%	250311-1	NPO-SI 15	TCZ-15	C10Q15C	CNO-415	5TCC-Q15S 10% *	
C16	470			250218-6	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C17	47		N750	250218-17	N750-DI 47	DTZ-47	C10Q47U	CN7-447	5TCU-Q47	
C18	5000			250175-30	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C19	.022	400		250211-9	P488N-022		CUB4S22	GEM-4122	4TM-S22	
C20	.1	600		250261-125	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C21	5000			250175-30	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C22	3300			250234-154	BPD-0033	DD-332	BYA10D33	B-233	5HK-D33	
C23	10000			250234-66	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C24	5000			250236-1	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C25	5		N470 5%							
C26	1500			250234-146	BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C27	5000			250175-30	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C28	5000			250175-30	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C29	10000	1000		250219-2	DAC-27	DD-103	BYA10S1	B-110	5HK-S1	
C30	10000	1000			DAC-27	DD16-103	HVE16S1	UAC-110	5HK-S1	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	3.3meg	1/2	220151-17	BT-180				Loudness, Channel 1 ①
B	3.3meg	1/2		STR-180				Loudness, Channel 2 ①
R2A	1meg	1/2	220151-16	B-70	AD47-1meg-Z	Q13-137		Bass, Channel 1
B	1meg	1/2		SR-70	Not Req.	M13-137	■	Bass, Channel 2
C	Shaft			Not Req.	FS-3	Not Req.		
R3A	1meg	1/2	220150-6	B-70	AD47-1meg-Z	Q13-137		Treble, Channel 1
B	1meg	1/2		SR-70	Not Req.	M13-137	♦	Treble, Channel 2
C	Shaft			Not Req.	FS-3	Not Req.		
D	Switch			KR-1	SWE-12	76-1		Power Off-On

① Taps @ 300K and 2meg.

■ "STA-LOC" Equivalent: FA16A, RU16A, CS3500.

▲ "STA-LOC" Equivalent: FA16A, RU16A, CS3500, US41.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	MAGNAVOX PART No.	NOTES
R4	1000Ω		230104-62	
R5	4700Ω		230104-70	
R6	4700Ω	1	230145-17	
R7	1meg		250153-1	
R8	100Ω		230104-50	
R9	1meg		230104-98	
R10	22K		230104-78	
R11	15K	1	230145-20	
R12	1meg		230104-98	
R13	2.2meg		230104-102	
R14	1000Ω		230104-62	
R15	68Ω		230104-48	
R16	220K		230104-90	

ITEM No.	RATING OHMS	RATING WATT	MAGNAVOX PART No.	NOTES
R17	47K		230104-82	
R18	47K		230104-82	
R19	1.5meg		230104-100	
R20	100K		230104-86	
R21	3300Ω		230104-68	
R22	1.5meg		230104-100	
R23	100K		230104-86	
R24	3300Ω		230104-68	
R25	8200Ω	2	230146-73	
R26	1000Ω	2	230146-13	
R27	2500Ω	5	240071-43	
R28	1meg		230104-98	

FM-AM TUNER PARTS LIST AND DESCRIPTIONS (cont)

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MAGNAVOX PART No.	REPLACEMENT DATA
K1	Limiter Decoupling	5000mmf, 5000mmf, 5000mmf, 5000mmf, 100Ω, 1000Ω, 22K, 47K	250255-1	Note 1
K2	Ratio Detector Load	120mmf, 330mmf, 330mmf, 120Ω, 1000Ω, 1500Ω, 8200Ω, 8200Ω, 68K	250254-1	Note 2
K3	Phono Input	100mmf, 100mmf, 470mmf, 1000mmf, 1000mmf, 2200mmf, 47K, 47K, 47K, 330K, 330K, 330K, 1meg	250315-1	
K4	Loudness Comp.	47mmf, 47mmf, 1000mmf, 1000mmf, 3300mmf, 3300mmf, 68K, 68K, 470K, 470K	250316	Note 3
K5	Treble Comp.	100mmf, 100mmf, 1000mmf, 1000mmf, 10000mmf, 10000mmf, 330K, 330K	250318-1	
K6	Bass Comp.	2000mmf, 2000mmf, 3300mmf, 3300mmf, 47K, 47K	250317-1	

Note 1. Alternate Part #250255-2. Note 2. Alternate Part #250254-2. Note 3. Alternate Part #250316-1.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		MAGNAVOX PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	360782-2						
L2	Osc. Coil	360702-1	14-1074	14-1074				
L3	2nd FM IF	360747-1	16-3490	16-3490		1463-PC		
L4	1st AM IF	360611-1	16-6758	16-6758	BC-352	12-C1	RF-1	
L5	Ratio Detector	360748-1	17-3492	17-3492		1465-PC		
L6	2nd AM IF	360781-1	16-6781	16-6781		13-PC6		
L7	Fil. Choke	360522-9	19-1002	19-1002	BC-563	4606		2uh

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M1	Tuning Cap.	260154-1	AM 2 Gang (Ant. 4-346mmf, Osc. 5-75mmf) Ch. 59-01,-03
	Tuning Cap.	260139-3	AM Ch. 59-02
M2	Tuner Assy.	700771-2	FM (Complete)
M3	Bandswitch Assy.	160307-1	Ch. 59-01
	Bandswitch Assy.	160306-2	Ch. 59-02
	Bandswitch Assy.	160306-1	Ch. 59-03
M4	Switch	160169-11	TV-Stereo (2 Position Rotary) Ch. 59-01
	Printed Board	210046A	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	MAGNAVOX PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M5		13T *				* Includes needle and mounting.

PHONO NEEDLE

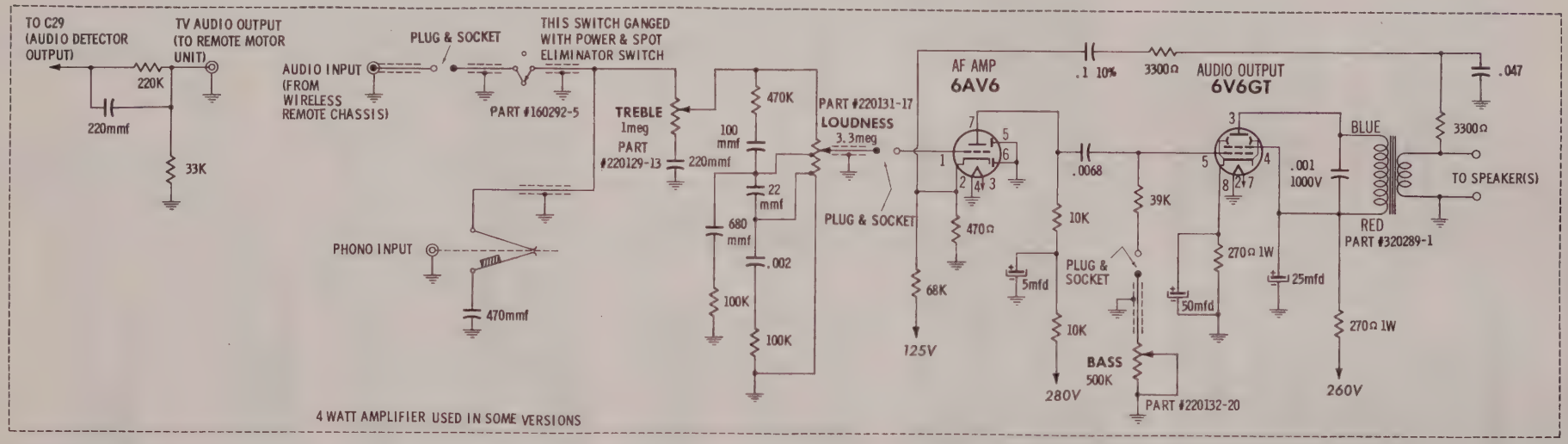
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

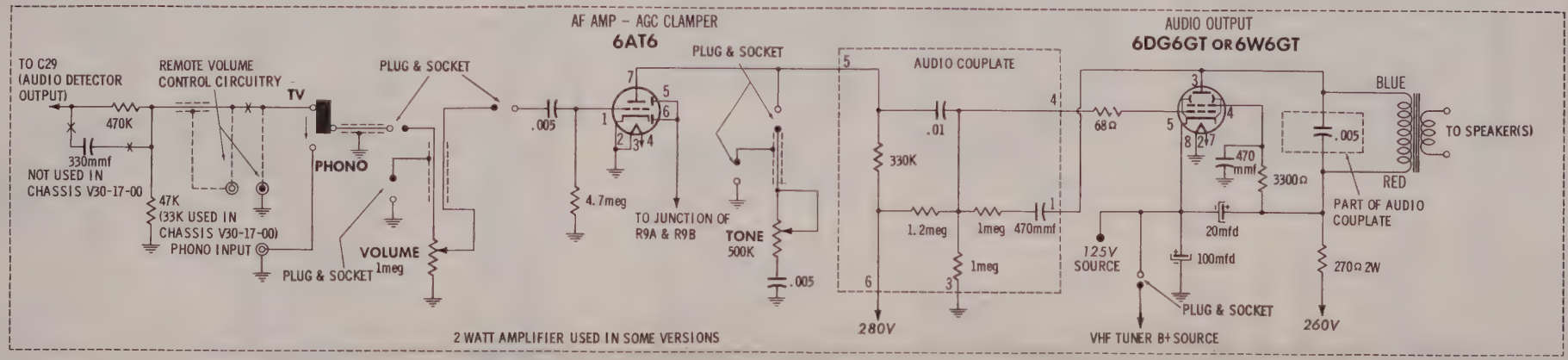
ITEM No.	REPLACEMENT DATA			REMARKS
	MAGNAVOX PART No.	JENSEN PART No.	WALCO PART No.	
M6	78RPM	E98 † or E98D ♦ &	W-101STS † * or W-102S † * or W-101STD ♦ *	* Includes Cartridge † Jewel ♦ Diamond
	LP	E98X † or E98XD ♦		

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Pointer	636180-2	
Dial Glass	150586-2	Ch. 59-01
Dial Glass	140320-1	Ch. 59-02
Dial Glass	150586-10	Ch. 59-03





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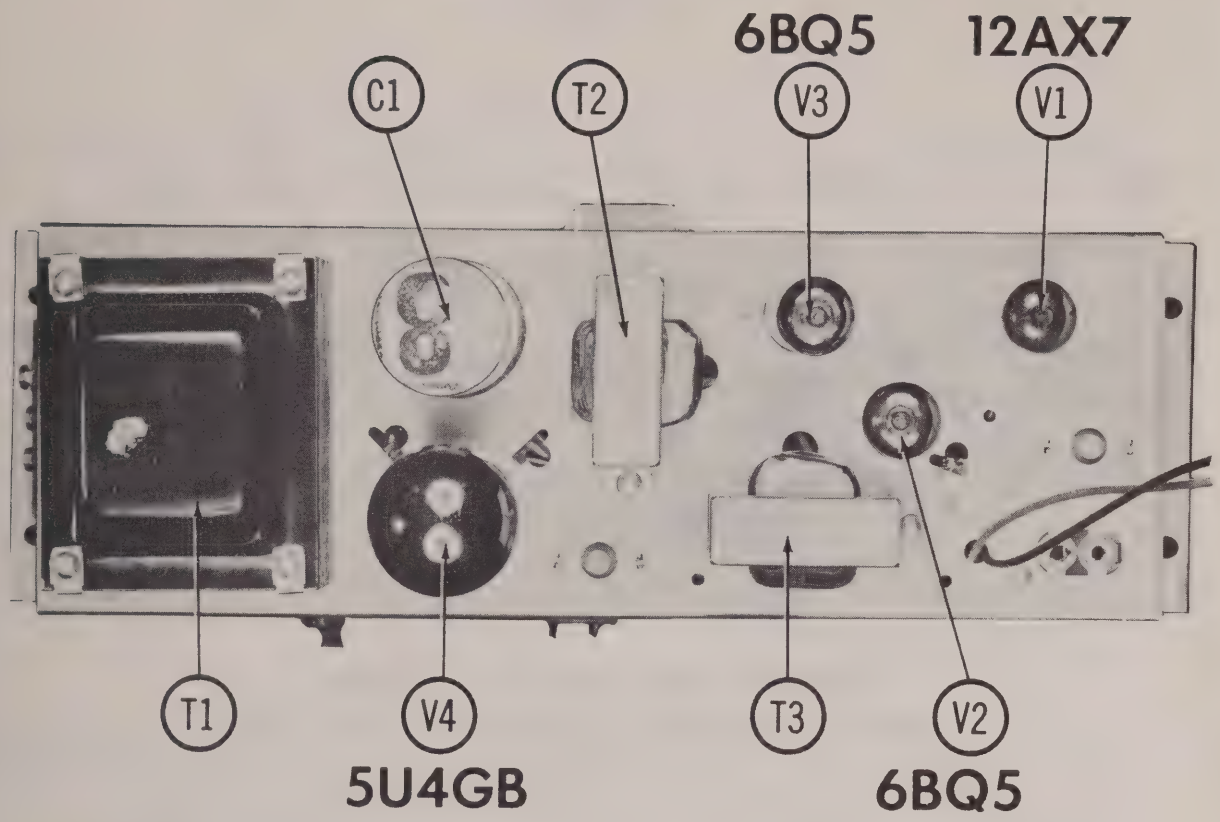
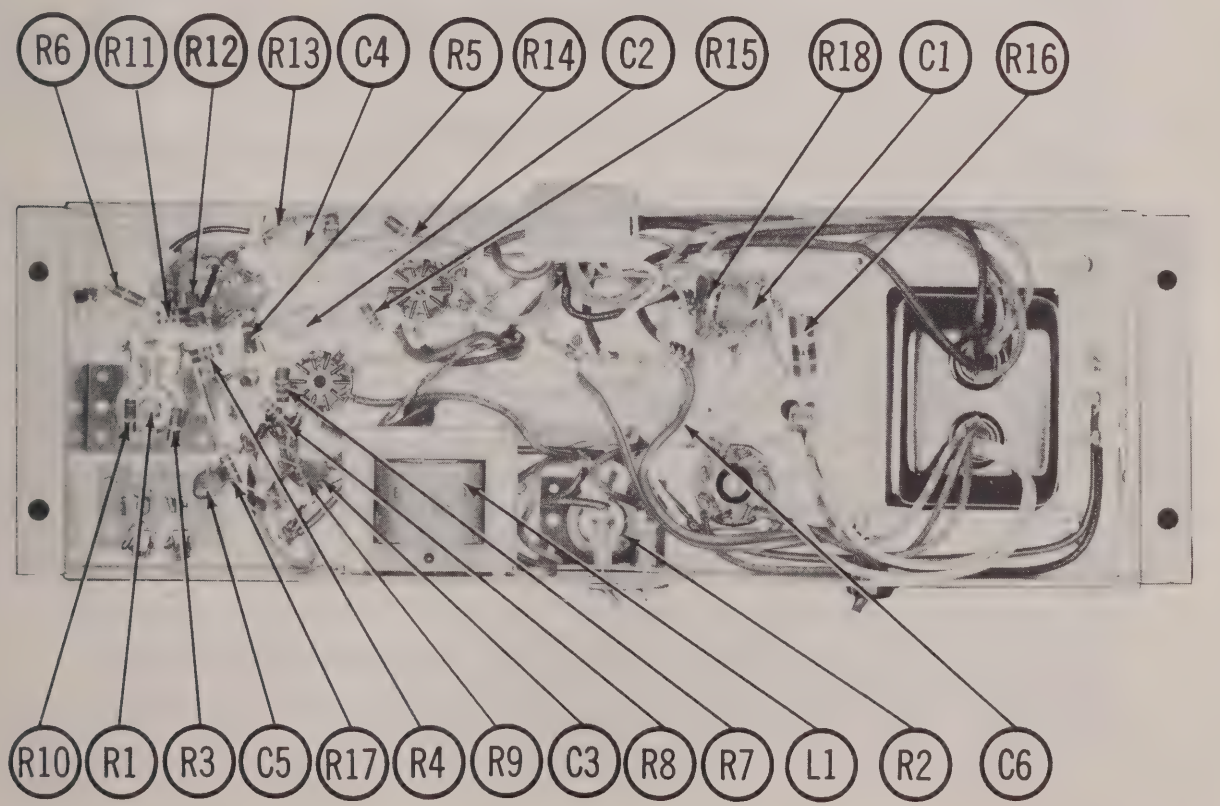
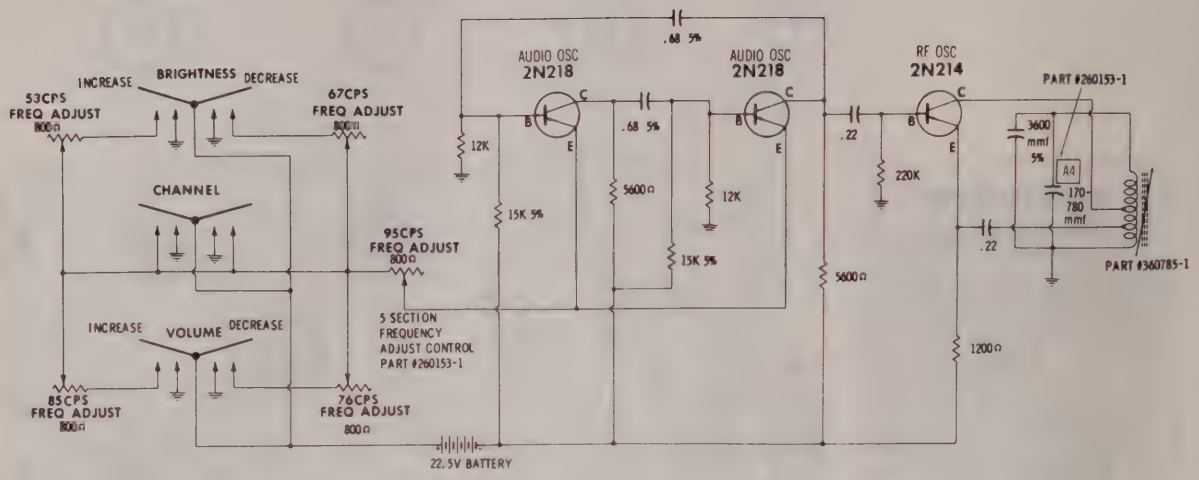
ALTERNATE CIRCUITS



AMPLIFIER CHASSIS AMP-196 - TOP VIEW



AMPLIFIER CHASSIS AMP-196 - BOTTOM VIEW



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REMOTE CONTROL TRANSMITTER 700782

REMOTE CONTROL ALIGNMENT INSTRUCTIONS

REMOTE CONTROL RECEIVER 700782 ALIGNMENT

It is recommended that alignment be made using the associated transmitter unit as a signal source.
Remove the bottom of the transmitter case and connect a short clip lead from the positive side of the battery to ground. This will energize the oscillator. Place the transmitter in the vicinity of the receiver during alignment. Alignment may be made with the receiver in the instrument if desired. If so, turn the TV off.
Turn the Remote Receiver on and allow 20 minutes warm-up period. Set the gain control fully clockwise.
Connect the DC probe of the VTVM to point (A). Common to chassis.
Adjust A1, A2 and A3 for maximum negative voltage reading on the VTVM. Repeat several times keeping the signal level below the level that produces -5 volts on the VTVM. The signal level may be varied by rotating the transmitter with relation to the receiver antenna.

REMOTE CONTROL TRANSMITTER 700781 OSCILLATOR ADJUSTMENTS

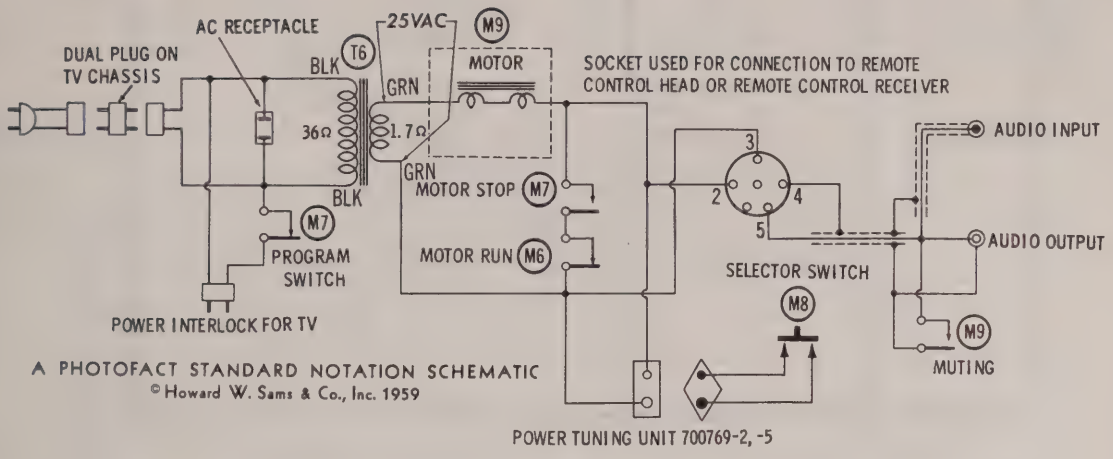
The audio oscillator is tuned to a specific frequency by means of a series of controls located in the transmitter. These controls are adjusted at the factory and should not need adjusting unless service is necessary. Remove the back from the transmitter case. Remove the receiver chassis cover so that the reed assembly is visible.
Depress the Channel Select button and while observing the Channel Select reed (the shortest of the five reeds in the receiver), adjust the Channel Select control in the transmitter for maximum vibration of the reed. Turn the control clockwise until the reed just ceases to vibrate, then rotate it counterclockwise 1/3 of the rotation between the two extremes. Repeat this procedure for each of the following:

1. Depress the Volume Increase button and adjust the Volume Increase control while observing the Volume Increase reed (second shortest reed).
2. Depress the Volume Decrease button and adjust the Volume Decrease control while observing the Volume Decrease reed (third shortest reed).
3. Depress the Brightness Decrease button and adjust the Brightness Decrease control while observing the Brightness Decrease reed (second longest reed).
4. Depress the Brightness Increase button and adjust the Brightness Increase control while observing the Brightness Increase reed (longest reed).

REMOTE CONTROL TRANSMITTER 700781 CARRIER ALIGNMENT

The associated receiver may be used as an indicator by connecting the DC probe of a VTVM to point (A) of the receiver. Common to chassis. Remove the bottom of the transmitter case and connect a short clip lead from the positive side of the battery to ground to energize the oscillator. Adjust A4 for maximum indication on the VTVM.
If it is known that the loop antenna of the transmitter has been replaced or tampered with, preset A4 1/4 turn from full clockwise rotation. Loosen the winding on the antenna nearest the front of the unit as it mounts in the case and slide this winding along the core until maximum indication is obtained on the VTVM. This will result in the proper frequency.
If two units employing the same carrier frequency are to be used in close proximity, it will be necessary to shift the carrier frequency of one of the units slightly. To do this, remove the back cover of the transmitter and turn A4 1/2 turn counterclockwise. This will shift the frequency approximately 4KC. This will naturally necessitate the realignment of the receiver.

POWER TUNING UNIT
700769-2



PARTS LIST AND DESCRIPTIONS

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R82A B	200K Switch	½	220152-1					Volume Channel Selector (Momentary)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T8	117V @ .57A	24V @ 2A		320286-2						

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M7	Switch	160295-1	Program Switch Assembly, Includes Motor Stop Switch and AC Off Switch
M8	Power Tuning Switch & Cable Assembly	700743	Includes Selector Switch & Cable Assembly
	Motor	500194-1	Includes Motor Run & Muting Switches

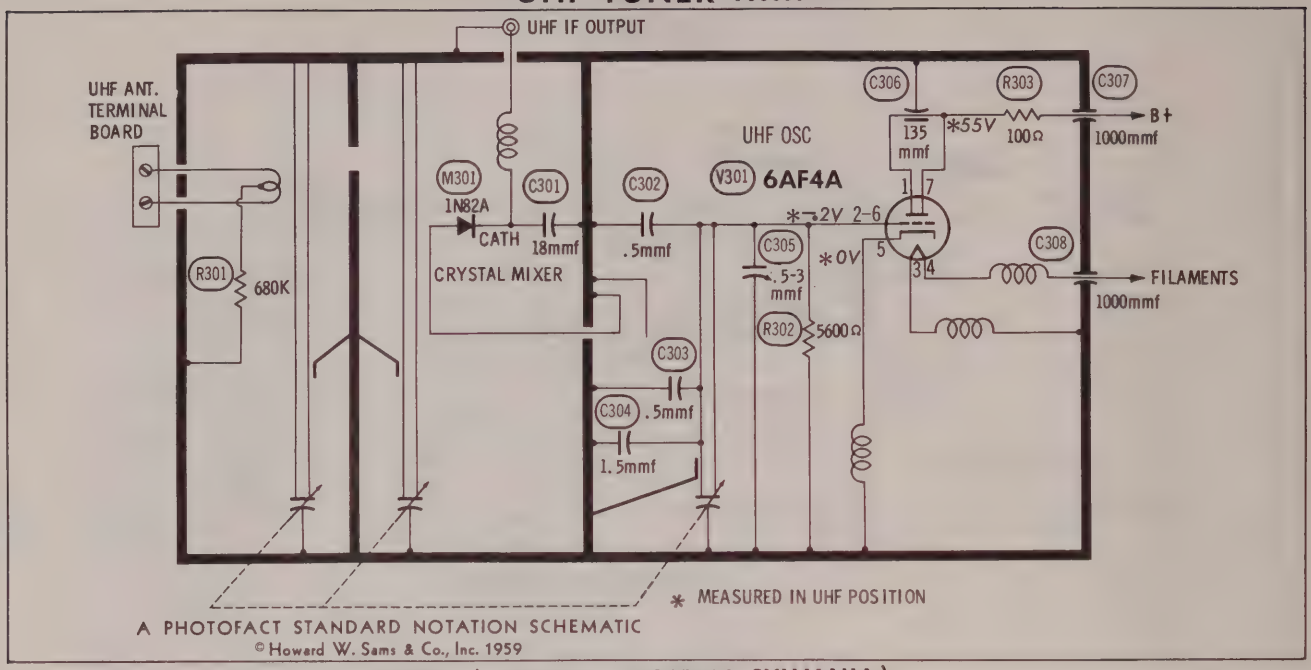
ADJUSTMENTS

1. To program channels for power and remote channel selector :
   a. Turn Channel Selector knob manually to set desired channel number to indicator line.
   b. Pull down on "Set" knob and release.
   c. Now when power button is pushed, the tuner will stop on the channel selected in step (1-a).

2. To program automatic power off position :
   a. Turn Channel Selector knob manually to the channel number (at indicator line) at which power off is desired.
   b. Turn "Set" knob to right and pull down to stop position.
   c. Now when tuner indexes at channel selected, the power to the TV will automatically shut off.

3. To clear a channel which is programmed :
   a. Set channel knob (1-a) above.
   b. Push up on "Clear" knob and release.
   c. Now the tuner will not stop on this channel.

UHF TUNER 700688



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TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V301	UHF Osc.	6AF4A	

ITEM No.	USE	TYPE	NOTES

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C301	18					TCZ-18	C10Q18C	CNO-418	5TCC-Q18S *	
C302	.5				NPO-SI .5	TCZ-R5				
C303	.5				NPO-SI .5	TCZ-R5				
C304	1.5				NPO-SI 1.5	TCZ-1R5	C10V15C	CNO-515	5TCCB-V15	
C305	.5-3					829-3				
C306	135									
C307	1000				EF-001	MFT-1000			503C-D1	
C308	1000				EF-001	MFT-1000			503C-D1	

RESISTORS

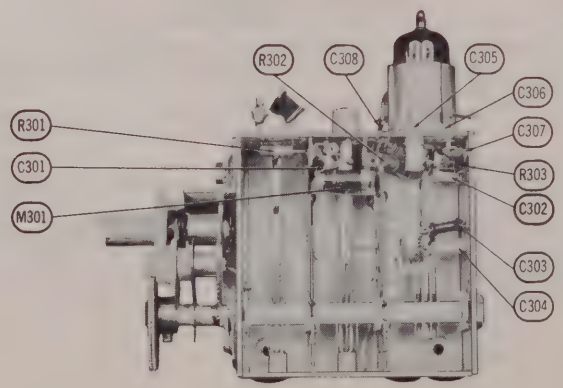
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MAGNAVOX PART No.	NOTES
	OHMS	WATT		
R301	680K			
R302	5600Ω			

ITEM No.	RATING		MAGNAVOX PART No.	NOTES
	OHMS	WATT		
R303	100Ω			

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MAGNAVOX PART No.	CBS PART No.	SYLVANIA PART No.	
M301	1N82A		1N82A	1N82A	UHF Mixer (Clip-in)



TUNER PARTS LIST AND DESCRIPTIONS

700662-1, -2

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BN4	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6CG8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	120		250278						7.5%
C202	30		250279						+7%, -3.5%
C203	28		250280						10%
C204	12		250281						10%
C205	800		250282						
C206	5-10		260149						
C207	47		250283						5%
C208	1-4.5		260148						
C209	800		250282						
C210	800		250282						
C211	1-4.5		260148						
C212	47		250285						10%
C213	30		260284						
C214	1000		250289	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C215	18		250287						N220 10%
C216	7.5		250286						N150 ±.25mmf
C217	1000		250288	EF-001	MFT-1000			503C-D1	
C218	800		250282						

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MAGNAVOX PART No.	NOTES
	OHMS	WATT		
R201	4700Ω			Note 1
R202	1000Ω		230104-60	
R203	3900Ω		230104-69	
R204	220K		230104-90	

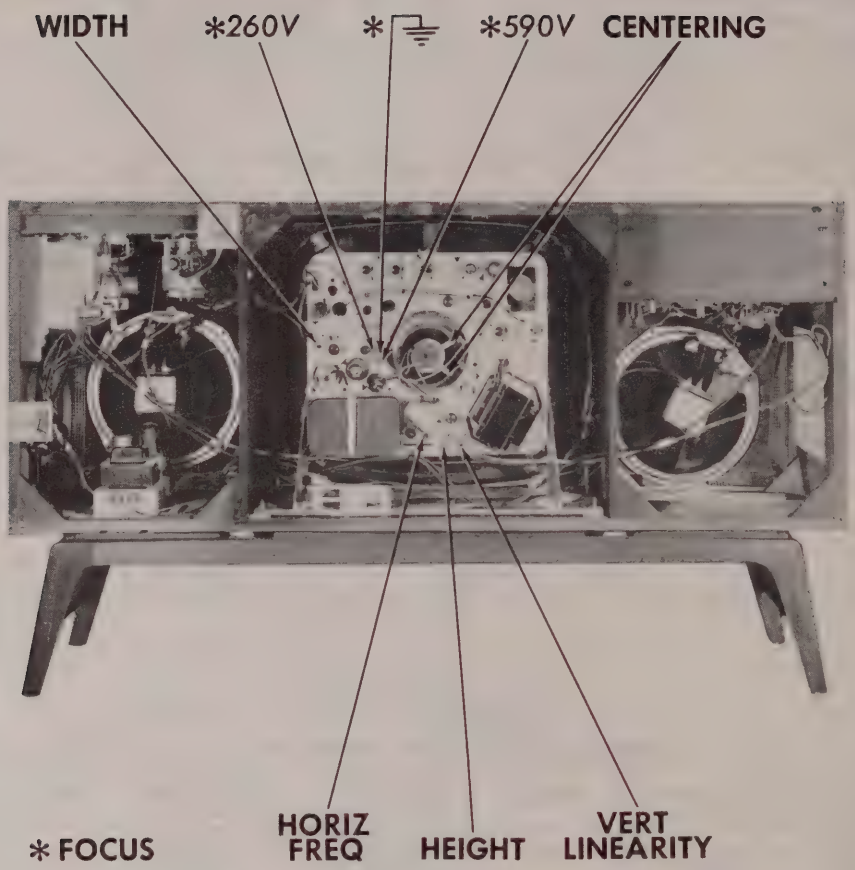
ITEM No.	RATING		MAGNAVOX PART No.	NOTES
	OHMS	WATT		
R205	10K		230104-74	
R206	3900Ω		230104-69	
R207	1000Ω		230104-62	
R208	3900Ω		230104-69	

Note 1. Some versions may use 47K in this application.

COILS (RF-IF)

ITEM No.	USE	MAGNAVOX PART No.	NOTES
L201	Ant. Trans. Assy.	360769	
L202	IF Trap Coil	360763	
L203	IF Trap Coil	360764	
L204A	Ant. RF, Mixer Grid, Osc. Coils	360761-2	Channel 2
B	"	360761-3	Channel 3
C	"	360761-4	Channel 4
D	"	360761-5	Channel 5
E	"	360761-6	Channel 6
F	"	360761-7	Channel 7
G	"	360761-8	Channel 8

ITEM No.	USE	MAGNAVOX PART No.	NOTES
L204H	Ant., RF, Mixer Grid, Osc. Coils	360761-9	Channel 9
I	"	360761-10	Channel 10
J	"	360761-11	Channel 11
K	"	360761-12	Channel 12
L	"	360761-13	Channel 13
L205	Fil. Choke	360768	
L206	RF Choke	360766	
L207	Fine Tuning Coil	360767	
L208	Mixer Plate Coil	360765	



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Set the Horizontal Hold control to the center of its range. Adjust the Horizontal Frequency slug (B1) until the picture synchronizes horizontally. Keep turning B1 in the same direction until the picture just falls out of sync. Reverse the direction of rotation until the picture just falls into sync. Rotate the Horizontal Hold control to both extreme ends of rotation. The picture should either stay in sync at both ends of rotation or should fall out of sync by an equal number of bars at each end. If neither of these conditions occur, repeat procedure.

Adjust the Width control for a picture slightly wider than necessary to fill the picture mask horizontally.

CHASSIS TOP VIEW

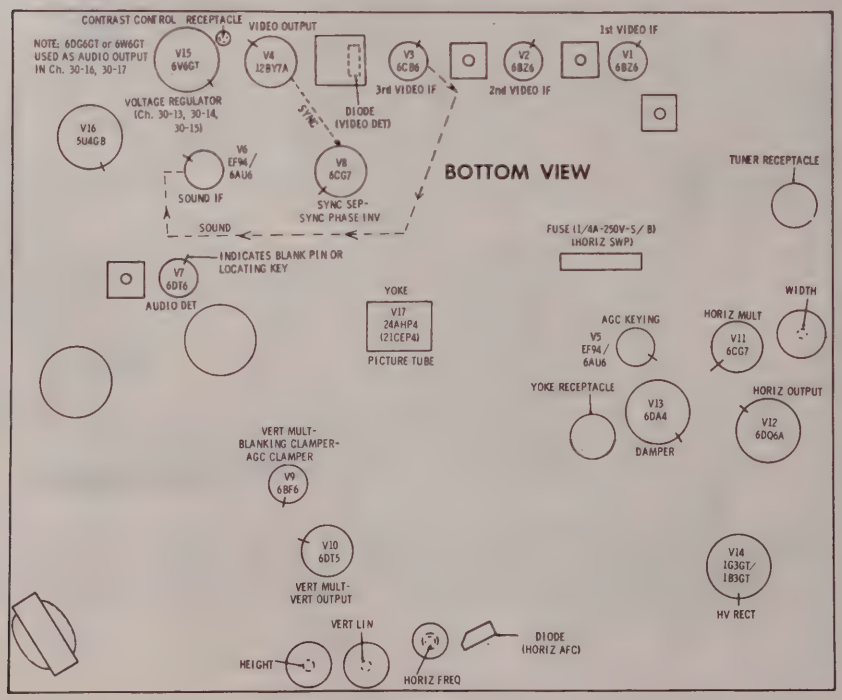
MAGNAVOX CHASSIS U30-15-00, V30-13-00
thru V30-17-00, AMP-196, 59-00-00 thru 59-03-00

FOLDER 1

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	60K	47Ω	.1Ω	0Ω	▪1500Ω	▪1500Ω	0Ω		
V2	6BZ6	58K	47Ω	.1Ω	0Ω	▪1500Ω	▪1500Ω	0Ω		
V3	6CB6	.1Ω	150Ω	.1Ω	0Ω	▪ 1500Ω	▪ 1500Ω	0Ω		
V4	12BY7A	• 50Ω	3900Ω	0Ω	.1Ω	.1Ω	0Ω	†5300Ω	†20K	0Ω
V5	EF94/ 6AU6	†20K	†1000Ω	0Ω	.1Ω	370K	†150K	†1000Ω		
V6	EF94/ 6AU6	4Ω	0Ω	.1Ω	0Ω	▪ 15K	▪ 15K	270Ω		
V7	6DT6	3.7Ω	680Ω	.1Ω	0Ω	†800K	▪ 6800Ω	470K		
V8	6CG7	†1.5meg	4.7meg	0Ω	0Ω	.1Ω	†14K	22K	3300Ω	0Ω
V9	6BF6	•1.5meg	0Ω	0Ω	.1Ω	15K	1.1meg	†5meg		
V10	6DT5	†220Ω	NC	1meg	.1Ω	0Ω	1meg	•500Ω	NC	†700Ω
V11	6CG7	†7500Ω	2meg	1300Ω	0Ω	.1Ω	†47K	•95K	1300Ω	0Ω
V12	6DQ6A	TP	.1Ω	TP	•†18K	1meg	NC	0Ω	0Ω	TOP CAP †18Ω
V13	6DA4	NC	NC	¶1.3meg	NC	†0Ω	NC	0Ω	.1Ω	
V14	1G3GT/ 1B3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP †450Ω
V15	6V6GT	TP	.1Ω	†0Ω	†0Ω	450K	NC	0Ω	¶	
V16	5U4GB	NC	¶	NC	28Ω	NC	26Ω	NC	¶	
V17	24AHP4	0Ω	15K	†480K	0Ω	NC	15K	•250K	.1Ω	
V201	6BN4	0Ω	1.1meg	0Ω	.1Ω	▪ 1000Ω	0Ω	1.1meg		
V202	6CG8	10K	▪ 5600Ω	0Ω	0Ω	.1Ω	▪ 1000Ω	▪ 10K	0Ω	320K
V301	6AF4A	▪ *6500Ω	*6000Ω	.1Ω	.2Ω	*.1Ω	*6000Ω	▪ *6500Ω		
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
▪ MEASURED FROM 125V SOURCE.
* MEASURED IN UHF POSITION.
† MEASURED FROM 285V SOURCE.
NC NO CONNECTION.
† MEASURED FROM PIN 3 OF V13.
TP TIE POINT.



TUBE PLACEMENT CHART

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

TRAV-LER MODELS 1770, U, 1771, U (Ch. 750-19)

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

TRAV-LER MODELS 1770, U, 1771, U (Ch. 750-19)

MODEL 1770U (CH. 750-19)

TRAV-LER MODELS 1770, U, 1771, U (Ch. 750-19)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PHOTOFACT* Folder

TRAV-LER MODELS 1770, U, 1771, U (Ch. 750-19)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL 1770U

1. Remove 8 metal screws holding rear cover. Remove the antenna connections and rear cover.
2. Remove 7 push-on type knobs from top and side.
3. Remove 6 metal screws holding top section of cabinet. Remove top.
4. Remove picture tube socket, yoke clamp, speaker leads, HV lead, and isolation capacitor and resistor.
5. Remove 4 chassis bolts, one on either side and 2 on the bottom.
6. Remove chassis.

MODEL 1770U (CH. 750-19)

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

TRADE NAME	Trav-Ler MODELS 1770, U, 1771, U CHASSIS 750-19
MANUFACTURER	Trav-Ler Radio & Tele. Corp., 571 West Jackson Blvd., Chicago 6, Illinois
TYPE SET	Television Receiver
TUBES	VHF-Seventeen, UHF-Eighteen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 170 Watts, 1.65 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

For picture tube, and safety glass cleaning, it is necessary to remove the chassis. (See "Disassembly Instructions".)

FUSE DEVICE

A 5.6Ω fusible resistor (R83) is used for low voltage power supply protection. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENTS

To touch-up the VHF Oscillator, remove Channel Selector and Fine Tuning knobs.

AGC

The AGC may be varied by means of an AGC control. (For location, see "Tube Placement Chart".)

FOCUS

No provision is made to vary the focus on this receiver.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

Coarse adjustment of the Horizontal Hold is accomplished by the proper setting of the Horizontal Frequency slug. (For location, see "Tube Placement Chart".)

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

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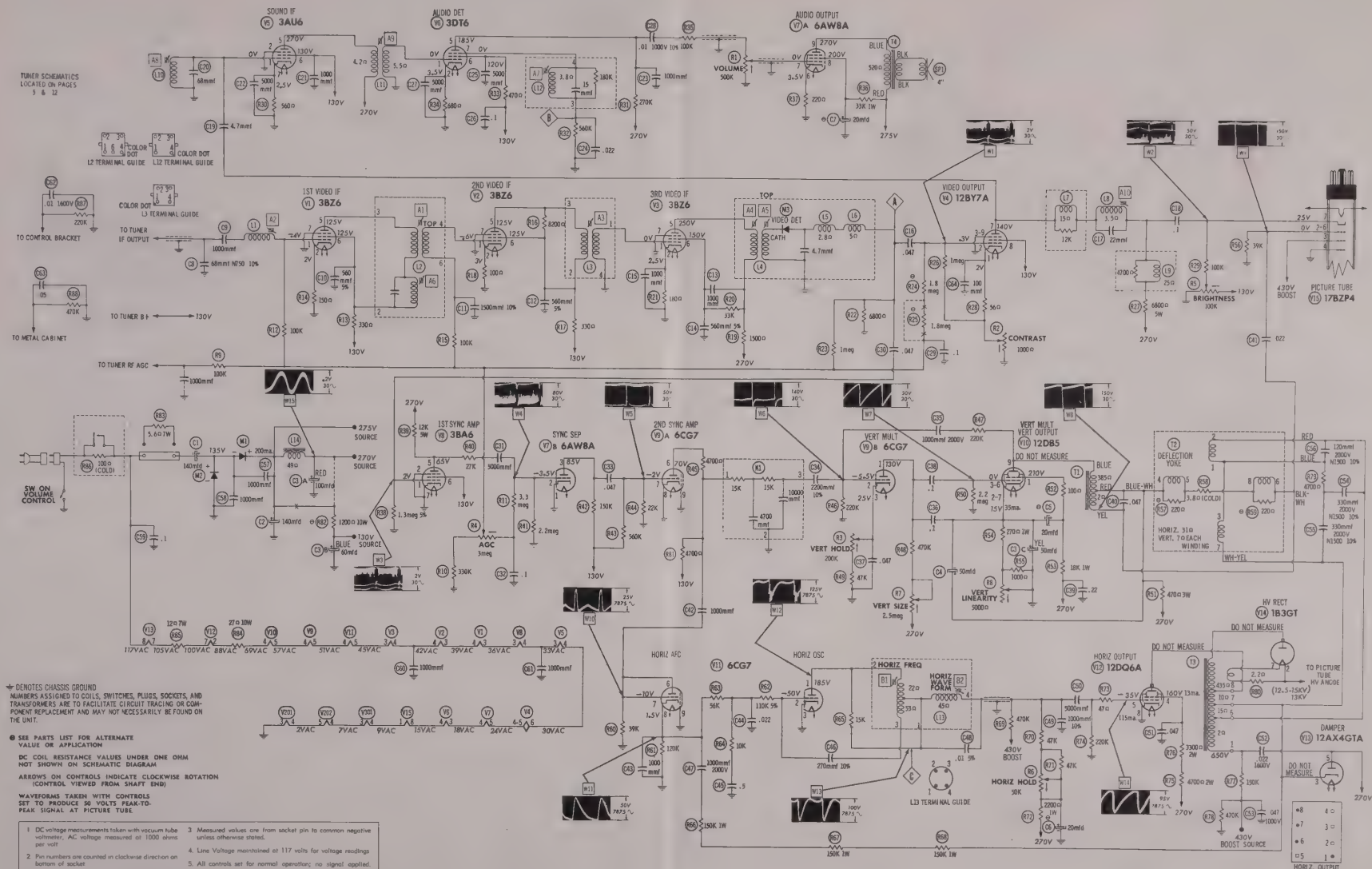
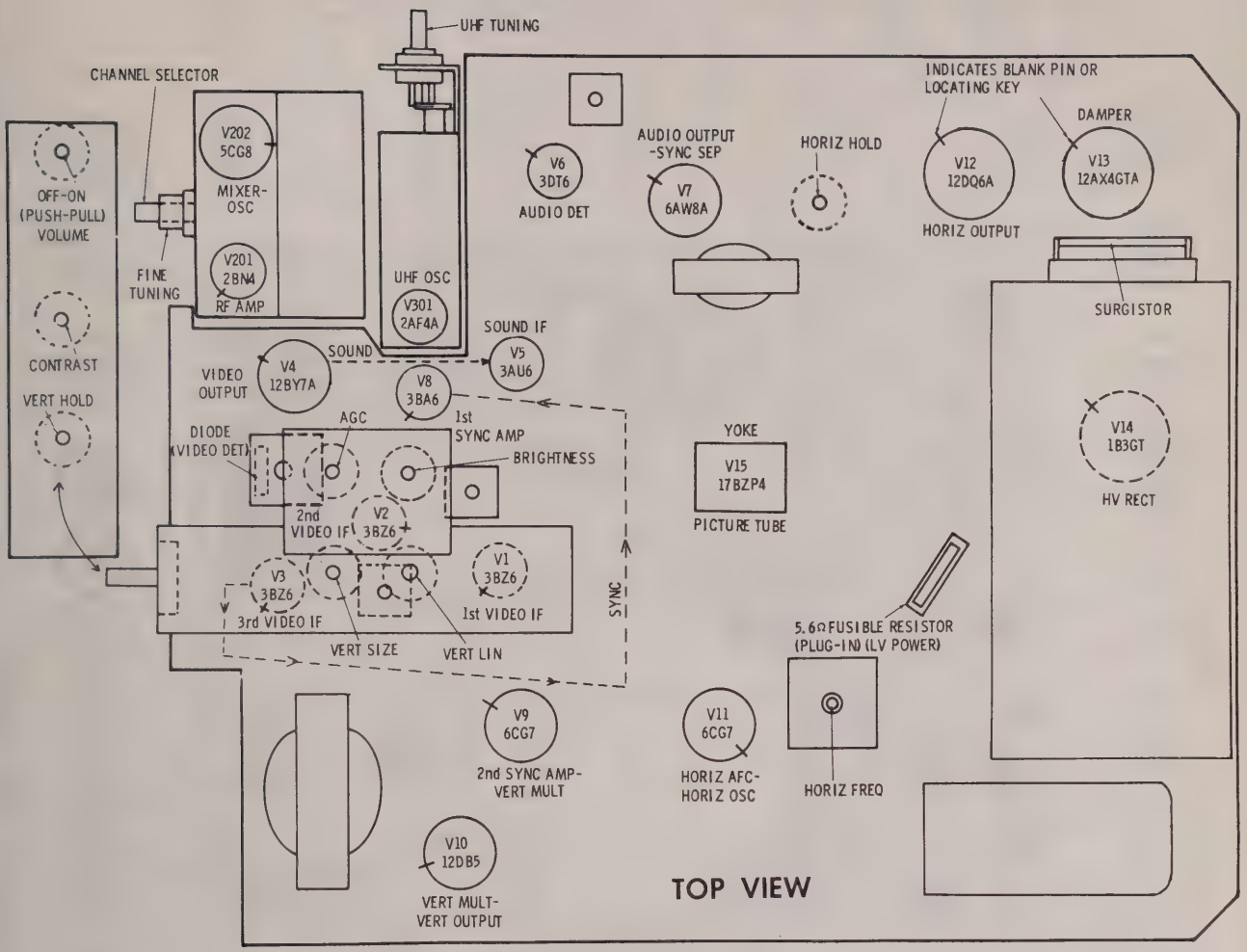
JA416

SET 454 FOLDER 2


SOUND IF V5 3AU6
AUDIO DET V6 3DT6
AUDIO OUTPUT V7A 6AW8A
VOLUME 500K
TUNER SCHEMATICS LOCATED ON PAGES 5 & 12
L2 TERMINAL GUIDE
L12 TERMINAL GUIDE
1ST VIDEO IF V1 3BZ6
2ND VIDEO IF V2 3BZ6
3RD VIDEO IF V3 3BZ6
VIDEO DET
VIDEO OUTPUT V4 12BY7A
L3 TERMINAL GUIDE
TO CONTROL BRACKET
TO TUNER IF OUTPUT
TO METAL CABINET
TO TUNER B+
TO TUNER RF AGC
BRIGHTNESS 100K
CONTRAST 1000Ω
430V BOOST
PICTURE TUBE V15 17BZP4
SW ON VOLUME CONTROL
1ST SYNC AMP V9 3BA6
SYNC SEP V7B 6AW8A
2ND SYNC AMP V9A 6CG7
VERT MULT V9B 6CG7
VERT MULT VERT OUTPUT V10 12DB5
DEFLECTION YOKE
HORIZ. 31Ω VERT. 7.9 EACH WINDING
AGC
VERT HOLD 200K
VERT SIZE 2.5meg
VERT LINEARITY 5000Ω
HV RECT V14 1B3GT
TO PICTURE TUBE HV ANODE (12.5-15KV) 13KV
HORIZ AFC
HORIZ OSC V11 6CG7
HORIZ FREQ
HORIZ WAVE FORM
HORIZ OUTPUT V12 12DQ6A
HORIZ HOLD 50K
DAMPER V13 12AX4GTA
HORIZ. OUTPUT TRANSFORMER TERMINAL BOARD
DO NOT MEASURE
117VAC 105VAC 100VAC 88VAC 69VAC 57VAC 51VAC 45VAC 42VAC 39VAC 36VAC 33VAC
2VAC 7VAC 9VAC 15VAC 18VAC 24VAC 30VAC
DENOTES CHASSIS GROUND
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1 DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation; no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1959
TRAV-LER MODELS 1770, U, 1771, U (Ch. 750-19)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

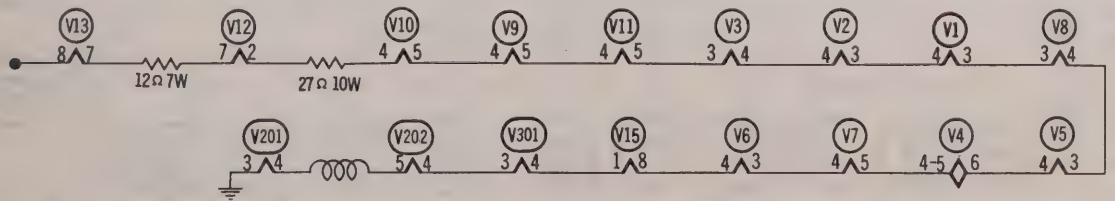
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor, Rectifiers (B+)

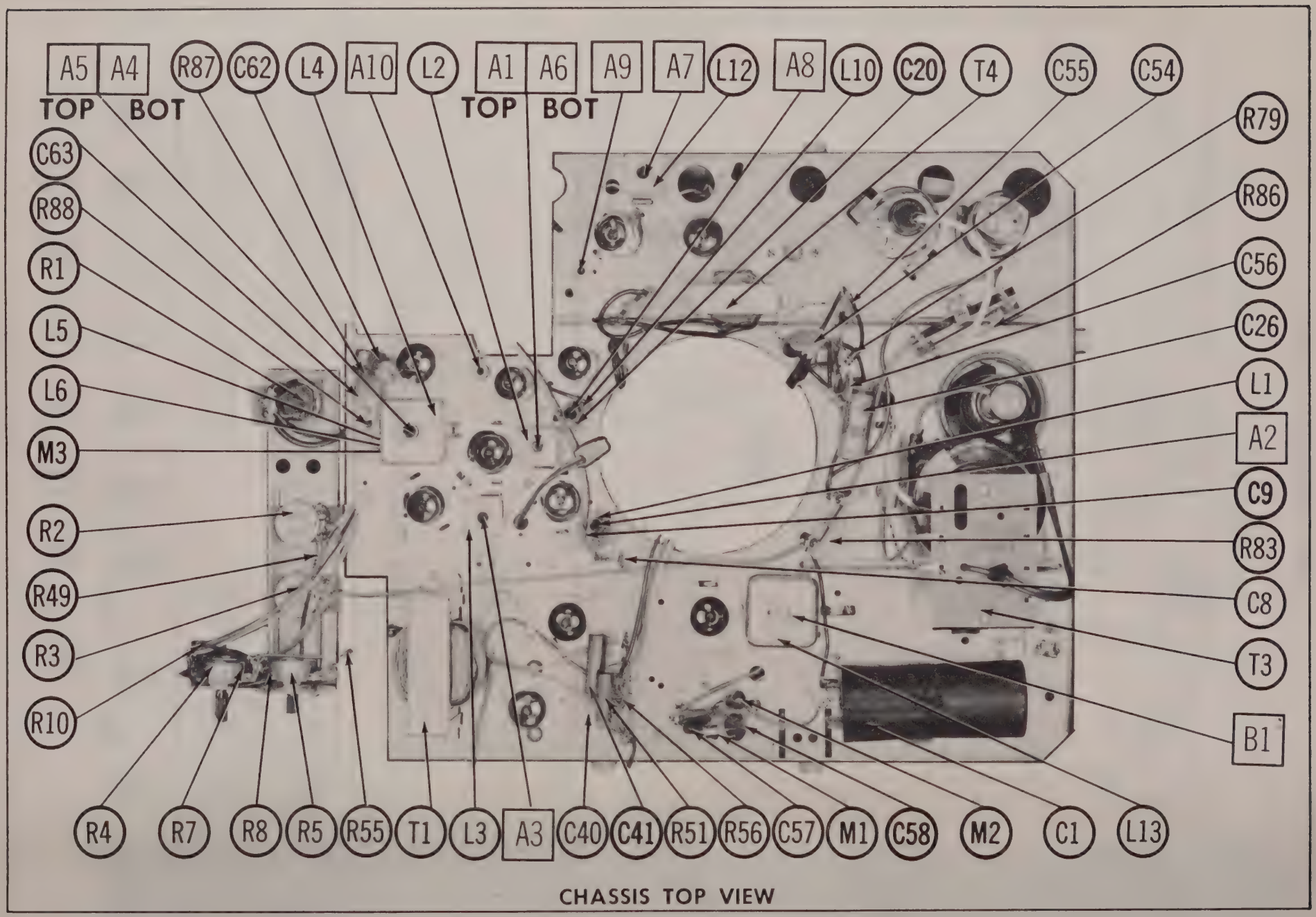
SWEEP FAILURE
No raster, has sound V11, V12, V13, V14, V15
No vertical deflection V9, V10
Poor vert. linearity or foldover V9, V10
Poor horiz. linearity or foldover V11, V12, V13
Narrow picture V11, V12, V13, Rectifiers (B+)
Vert. off freq. V9, V10
Horiz. off freq. V11, V12

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det.), V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V15
Has pic, no sound V5, V6, V7

SYNC FAILURE
No vert. sync V8, V7, V9
No horiz. sync V8, V7, V9, V11
No vert. or horiz. sync V8, V7, V9

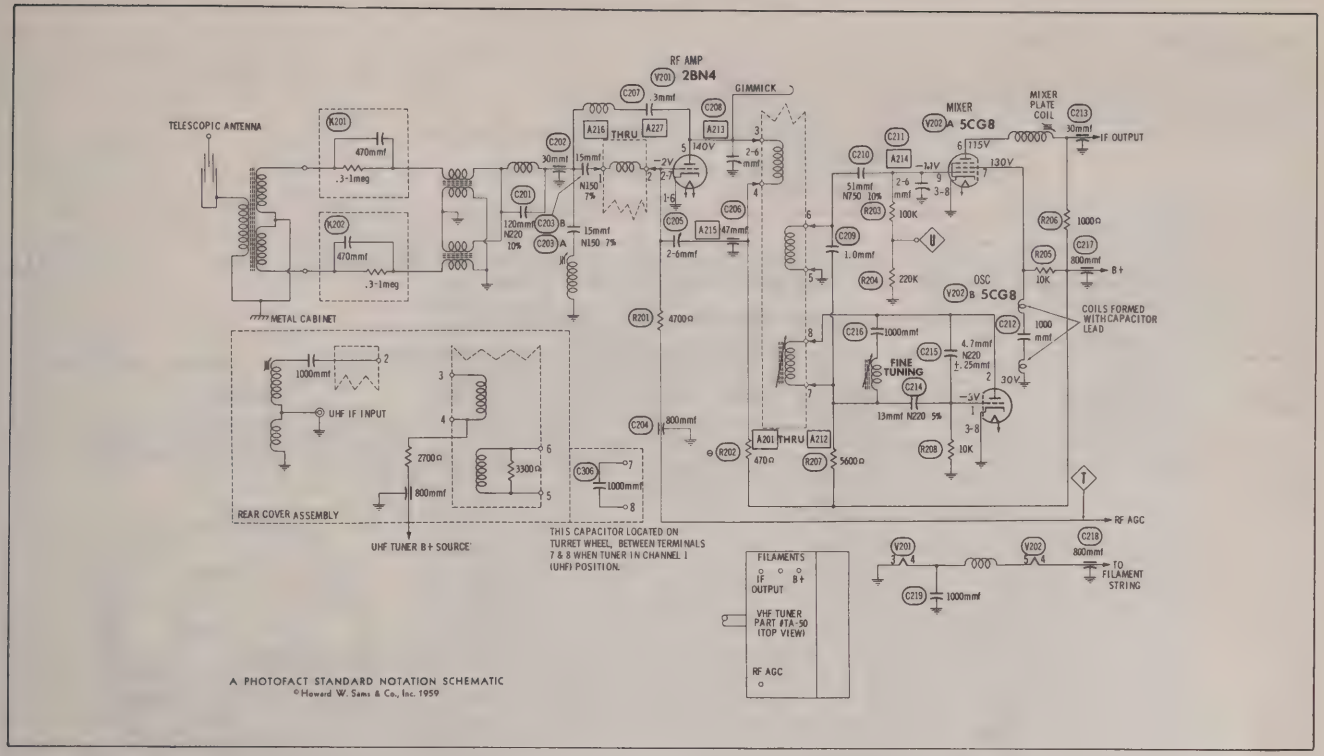
This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)





CHASSIS TOP VIEW

TUNER TA-50



TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amplifier	2BN4	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	5CG8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	120		N220 10%	13L-031						
C202	30			13M350U300N-02						
C203A	15		N150 7%	13L8PG150N2						
B	15		N150 7%							
C204	800				EF-000	MFT-1000			503C-D1	
C205	2-6			31B-902-01		829-6				
C206	47			13M320U470J-09	EF-00005	MFT-50				
C207	.3									
C208	2-6			31B-902-01		829-6				
C209	1			13D-111-35	NPO-SI 1	TCZ-1		CNO-510	5TCCB-V1S 10%*	
C210	51		N750 10%	13L-029	NPO-DI 50	TCZ-51	C10Q51U		5TCU-Q51S 10% *	
C211	2-6			31B-902-01		829-6				
C212	1000			13LX102Z	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C213	30			13M350U300N-02						
C214	13		N220 5%	13L8R130J						
C215	4.7		N220 ± .25mmf	13L8R4R7C						
C216	1000			13LX102Z	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C217	800				EF-001	MFT-1000			503C-D1	
C218	800				EF-001	MFT-1000			503C-D1	
C219	1000			13LX102Z	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	

NOTE: Part numbers listed above are "Standard Coil" Part Numbers.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PART No.	NOTES
	OHMS	WATT		
R201	4700Ω		12TAE472M-01-02-03	Note 1
R202	470Ω			
R203	100K		12TAE104M-01-02-03	
R204	220K		12TAE224M-01-02-03	

ITEM No.	RATING		PART No.	NOTES
	OHMS	WATT		
R205	10K		12TAE103M-01-02-03	
R206	1000Ω		12WAE102M-01	
R207	5600Ω		12TAE562K-01-02-03	
R208	10K		12TAE103M-01-02-03	

Note 1. Some versions may use 1000Ω in this application (Part #12TAE102M-01-02-03).
NOTE: Part numbers listed above are "Standard Coil" Part Numbers.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	PART No.	REPLACEMENT DATA	
K201	Antenna Isolation	470mmf, .3-1meg		Centralab Sprague	RC-471 AC1-1
K202	Antenna Isolation	470mmf, .3-1meg		Centralab Sprague	RC-471 AC1-1

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201 thru A212 ... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
WALSCO # 2531
A213 thru A215 .... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. load.	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A202	
			201MC	199.25MC 203.75MC	11		A203	
			195MC	193.25MC 197.75MC	10		A204	
			189MC	187.25MC 191.75MC	9		A205	
			183MC	181.25MC 185.75MC	8		A206	
			177MC	175.25MC 179.75MC	7		A207	
			85MC	83.25MC 87.75MC	6		A208	
			79MC	77.25MC 81.75MC	5		A209	
			69MC	67.25MC 71.75MC	4		A210	
			63MC	61.25MC 65.75MC	3		A211	
			57MC	55.25MC 59.75MC	2		A212	

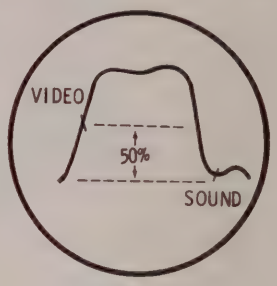


FIG. 201

VHF RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Connect the negative lead of a 4.5 volt bias supply to point (1). Positive to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point (1). Low side to chassis.	A213, A214, A215	Adjust A213 and A214 for maximum amplitude and symmetry with markers as shown in Fig. 202. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A215 to obtain MINIMUM response on the scope. Reduce bias.
3.	"	"	213MC	211.25MC 215.75MC	13	"	A216	Adjust for maximum amplitude of response similar to Fig. 202. Adjust by expanding or compressing coil turns.
			207MC	205.25MC 209.75MC	12		A217	
			201MC	199.25MC 203.75MC	11		A218	
			195MC	193.25MC 197.75MC	10		A219	
			189MC	187.25MC 191.75MC	9		A220	
			183MC	181.25MC 185.75MC	8		A221	
			177MC	175.25MC 179.75MC	7		A222	
			85MC	83.25MC 87.75MC	6		A223	
			79MC	77.25MC 81.75MC	5		A224	
			69MC	67.25MC 71.75MC	4		A225	
			63MC	61.25MC 65.75MC	3		A226	
			57MC	55.25MC 59.75MC	2		A227	

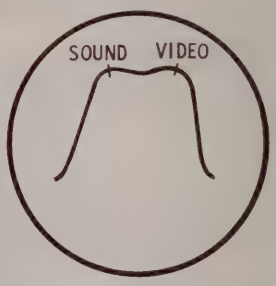
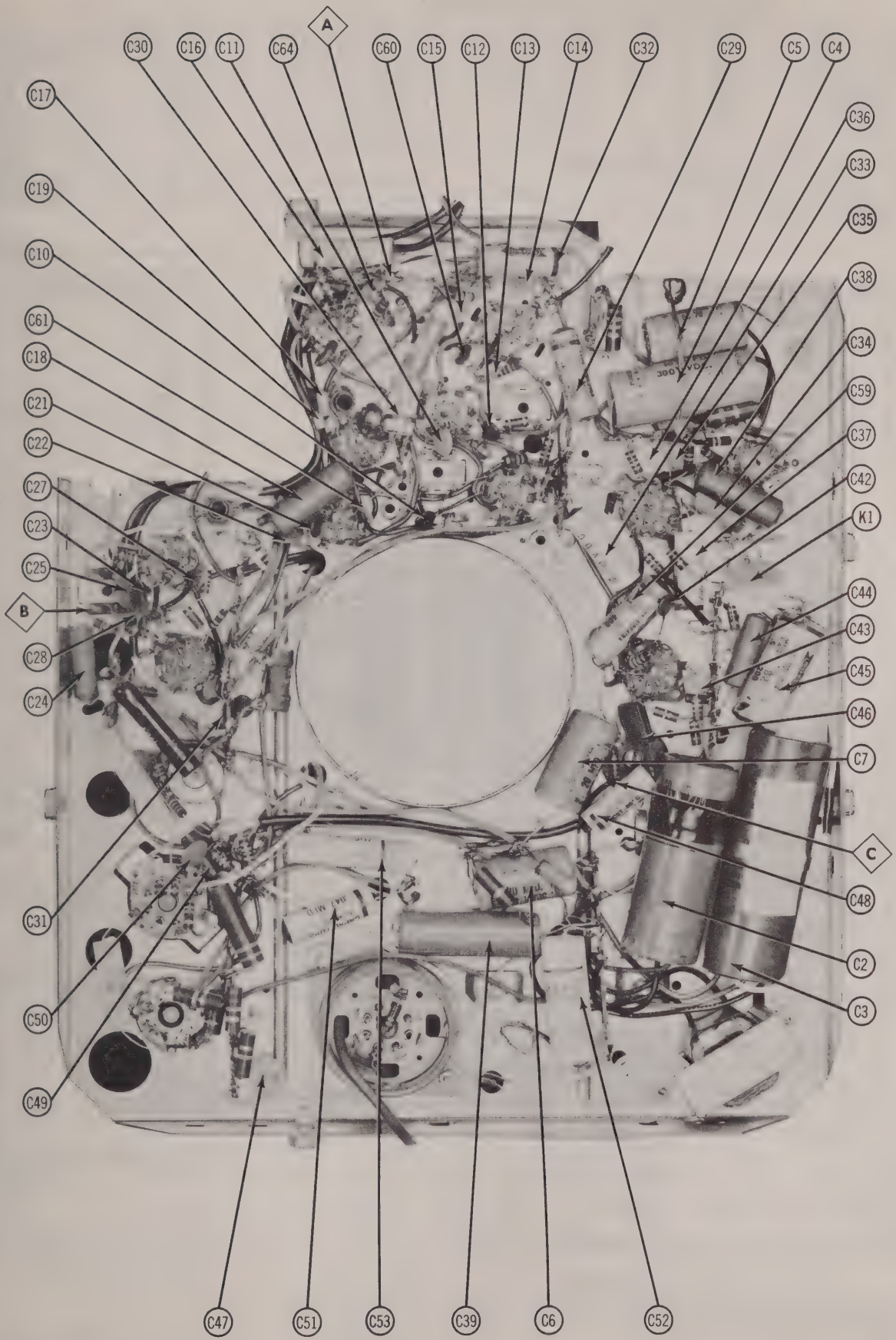


FIG. 202

UHF ALIGNMENT

This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

SET 454 FOLDER 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	1st Video IF Amp.	3BZ6	
V2	2nd Video IF Amp.	3BZ6	
V3	3rd Video IF Amp.	3BZ6	
V4	Video Output	12BY7A	
V5	Sound IF Amp.	3AU6	
V6	Audio Det.	3DT6	
V7	Audio Output-Sync Sep.	6AW8A	
V8	1st Sync Amp.	3BA6	
V9	2nd Sync Amp.-Vert. Mult.	6CG7	
V10	Vert. Mult.-Vert. Output	12DB5	
V11	Horiz. AFC-Horiz. Osc.	6CG7	
V12	Horiz. Output	12DQ6A	
V13	Damper	12AX4GTA	
V14	HV Rect.	1B3GT	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	TRAV-LER PART No	GENERAL ELECTRIC PART No	RCA PART No.	SYLVANIA PART No.	
V15	17BZP4	17CKP4 ①	17BZP4 ①	17BZP4/ 17CAP4 ②	① Aluminized ② "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						NOTES
	CAP	VOLT	TRAV-LER PART No	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No	PYRAMID PART No	SPRAGUE PART No.	
C1	140	200	EC-64	AFHSI-37-25	XA0266	FP131	TMS-34	TVL-1540	
C2	140	300	EC-55	PRI-100	BBRD-0334	WS427	TD-150-300	TVA-1575	
C3A	100	300	EC-112		D0044	WT430		TVAS-3558. 7*	
B	60	300			BR505	TC39			
C	50	50							
C4	50	300	EC-111	PRS150V50	BR5035	TC79	TD-50-450	TVA-1713	
C5	20	300	EC-70	PRS450V20	BR2035	TC65	TD-20-350	TVA-1608	Note 1
C6	20	300	EC-70	PRS450V20	BR2035	TC65	TD-20-350	TVA-1608	Note 1
C7	20	300	EC-70	PRS450V20	BR2035	TC65	TD-20-350	TVA-1608	Note 1

Note 1. An alternate Part #EC-57, 10mfd ① 300V may be used in this application.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	CAP.	VOLT	TOL	TRAV-LER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C8	68		N750 10%		N750-DI 68	DTN-68	C0Q468U	CNT-468	5TCU-Q68S 10% *	
C9	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C10	560		5%			D6-561	1R5T56	JL-356	5GA-T56S 5% *	
C11	1500		10%		DI-1500		1R5D15	JL-215	5GA-D15S 10% *	
C12	560		5%			D6-561	L10T56	JL-356	5GA-T56S 5% *	
C13	1000				BPD-001	DD-103	BYA10D1	B-210	5HK-D1	
C14	560		5%			D6-561	L10T56	JL-356	5GA-T56S 5% *	
C15	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C16	.047	200			P288N-047	DF-503	CUB3S47	GEM-4147	5TM-S47	
C17	22				SI 22	D6-220	L10Q22	UC-5422	5GA-Q22	
C18	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C19	4.7				NPO-SI 4.7	TCZ-4R7	C10V47C	CNO-547	5TCUS-V47	
C20	68				SI 68	D6-680	L10Q68	UC-5468	5GA-Q68	
C21	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C22	5000				BPD-005	DD-503	BYA10D5	B-250	5HK-D5	
C23	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C24	.022	200			P288N-022	DF-303	CUB4S22	GEM-4122	5TM-S22	
C25	5000				BPD-005	DD-503	BYA10D5	B-250	5HK-D5	
C26	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C27	5000				BPD-005	DD-503	BYA10D5	B-250	5HK-D5	
C28	.01	1000	10%					GEM-1511	10TM-S1	
C29	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C30	.047	200			P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C31	5000				BPD-005	DD-503	BYA10D5	B-250	5HK-D5	
C32	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C33	.047	200			P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C34	2200		10%		1464-0022		1R5D22		MS-222	
C35	1000	2000		CC-98	HVD-30-1000	DD30-102	HVB20D1	2HV-210	20CA-D1	
C36	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C37	.047	200			P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C38	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C39	.22	600			P688N-22		CUB6P22	GEM-6022	6TM-P22	
C40	.047	600			P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C41	.022	200			P288N-022	DD-303	CUB4S22	GEM-4122	2TM-S22	
C42	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C43	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C44	.022	200			P288N-022	DD-303	CUB4S22	GEM-4122	2TM-S22	
C45	.5	200			P288N-5		CUB2P5	GEM-205	2TM-P5	
C46	270		10%	MC-22	1469-271	MD-271		22S5127	MS-327	
C47	1000	2000		CC-53	HVD-30-1000	DD30-102	HVB20D1	2HV-210	20CA-D1	
C48	.01	800	5%	PC-29	V84C6SI 5%				6TM-SI5 5% *	
C49	1000		10%		1469-001		1R5DI	MCB256	MS-210	
C50	5000				DI-5000	DD-502	BYA10D5	B-250	5HK-D5	
C51	.047	600			P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C52	.022	1600		PC-85C	P1884CM-022		CUB1S22	GEM-1612	MS-822	
C53	.047	1000		PC-88C	P1088N-047		CUB1S47	GEM-10147	10TM-S47	
C54	330	2000	N1500 10%	CC-119						
C55	330	2000	N1500 10%	CC-119						
C56	120	2000	N1500 10%	CC-118						
C57	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C58	1000				BPD-001	DD-103	BYA10D1	B-210	5HK-D1	
C59	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C60	1000				BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C61	1000				BPD-001	DD-103	BYA10D1	B-210	5HK-D1	
C62	.01	1600		PC-33C	P1884CM-01		CUB1S3	GEM-1611	MS-31	
C63	.05	400			P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C64	100				SI 100	D6-101	L10T1	UC-531	5GA-T1	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRAV-LER PART No	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No	
R1A	500K	½	VC-120				PP55A	Volume
B	Switch						Not Req.	Push-Pull Off-On
R2A	100KΩ	½	VC-82	B-505		B17-208	SK-1	Contrast
B	Shaft			Not Req.		Not Req.		

CONTROLS (cont)

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRAV-LER PART No	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No	
R3A	200K	½	VC-132	BX-46	A47-200K-S	QU-129	TA254L	Vert. Hold
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4A	3meg	½	VC-131	AB-84	B47-3meg-S	QU-140	PTA359L	AGC
B	Shaft			AK-19	Not Req.	TQ	Not Req.	
R5A	100K	½	VC-84	AB-40	B47-100K-S	QU-138	PTA15L	Brightness
B	Shaft			AK-19	Not Req.	TQ	Not Req.	
R6A	50K	½	VC-83	B-31	A47-50K-S	QU-123	TA54L	Horiz. Hold
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R7A	2.5meg	½	VC-78	AB-83	B47-2.5meg-S	QU-239	SU-585	Vert. Size
B	Shaft			AK-19	Not Req.	TQ	Not Req.	
R8A	5000Ω	½	VC-85	AB-10	B47-5000-S	QU-114	SU-14	Vert. Lin.
B	Shaft			AK-19	Not Req.	TQ	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		TRAV-LER PART No.	NOTES
	OHMS	WATT		
R9	100K			
R10	330K			
R11	3.3meg			
R12	100K			
R13	330Ω			
R14	150Ω			
R15	100K			
R16	8200Ω			
R17	330Ω			
R18	100Ω			
R19	1500Ω			
R20	33K			
R21	180Ω			
R22	6800Ω			
R23	1meg			
R24	1.8meg		Note 1	
R25	1.8meg		Note 1	
R26	1meg			
R27	6800Ω	5	WR-8	
R29	56Ω			
R29	100K			
R30	560Ω			
R31	270K			
R32	560K			
R33	470Ω			
R34	660Ω			
R35	100K			
R36	33K	1		
R37	220Ω			
R38	1.3meg 5%		IR-111	
R39	12K	5	WR-37	
R40	27K			
R41	2.2meg			
R42	150K			
R43	560K			
R44	22K			
R45	4700Ω			
R46	220K			
R47	220K			
R48	470K			

ITEM No.	RATING		TRAV-LER PART No.	NOTES
	OHMS	WATT		
R49	47K			
R50	2.2meg			
R51	470Ω	3		
R52	100Ω			
R53	18K	1		
R54	270Ω	1		
R55	1000Ω			
R56	39K			
R57	220Ω			Note 2
R58	3.8Ω Cold		IR-284	
R59	220Ω			Note 2
R60	39K			
R61	120K			
R62	110K 5%		IR-147	
R63	56K			
R64	10K			
R65	15K			
R66	150K	1		
R67	150K	1		
R68	150K	1		
R69	470K			
R70	47K			
R71	47K			
R72	2200Ω	1		
R73	47Ω			
R74	220K			
R75	4700Ω	2		
R76	3300Ω	2		
R77	150K			
R78	470K			
R79	4700Ω			
R80	2.2Ω		IR-142	
R81	4700Ω			
R82	12000	10		Note 3
R83	5.6Ω	7	F-8-1	
R84	27Ω	10	WR-26	
R85	12Ω	7	WR-34	
R86	100Ω Cold		F-9	Surgistor
R87	220K			
R88	470K			

Note 1. Some versions may use a single 3.8meg to replace R24 and R25.
Note 2. Some versions may use 680Ω in this application.
Note 3. Some versions may use 2100Ω 10W in this application (Part #WR-28).

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	TRAV-LER PART No.	REPLACEMENT DATA
K1	Vert. Integrator	4700mmf, 10000mmf, 15K, 15K	CC-120	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		TRAV-LER PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	1st Video IF	L-83	17-4534	17-4534	TV-131		VF-4	
L2A	2nd Video IF	L-103	17-5002	17-5002				
B	41.25MC Trap							
L3	3rd Video IF	L-104	17-5004	17-5004	TV-138	6324		
L4	4th Video IF	L-84	17-4523	17-4523	TV-130	6219	VF-3	
L5	RF Choke	L-85	19-1005	19-1005	BC-586	4612		9.3uh
L6	Series Peaking Coil	L-87	19-7068	19-7068	TV-186			65uh
L7	Series Peaking Coil	L-86A	19-3500 *	19-3500 *	TV-188 *	6138 *	VP-8 *	478uh ①
L8	4.5MC Trap	L-89	20-1004	20-1004	TV-151	1469 ▲	SF-3	
L9	Shunt Peaking Coil	L-88	19-5100 *	19-5100 *		6157 ■		1.07MH ②
L10	1st Sound IF	L-90	17-3400	17-3400	TV-151	1469	SF-3	
L11	2nd Sound IF	L-80A			TV-149			
L12	Quadrature Coil	L-110				1481 ●	SD-5 ■	

* Parallel with 12K resistor. ■ Parallel with 4700Ω resistor. ◆ Parallel with 180K resistor. ② Wound on 4700Ω resistor.
▲ Disregard tap. ● Parallel with 8200Ω resistor. ① Wound on 12K resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	TRAV-LER PART No.	Halldorson PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	
L13A	75Ω		L-119A						Horiz. Osc. tapped ② 53Ω
B	45Ω								Horiz. Waveform

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~/~)	TRAV-LER PART No	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No	Triad PART No
L14	.200A	49Ω	1 Hy.	FC-5	26C41	C-2976 ①	F-803 ①	C-2326 ①	26C41	C-24X

① Drill new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							
		TRAV-LER PART No	Halldorson PART No	Merit PART No.	Ram PART No	Rogers PART No	Stancor PART No.	Thordarson PART No	Triad PART No
T1	Vert. Output	TR-50	26S14		V319			26S14	A-113X ①
T2	Yoke-Horiz. (16 5MH) (110°)-Vert. (13MH)	L-147	Y-48 ② ③		Y-110 ② ③		DY-27A ② ③	Y-48 ② ③	Y-60 ④ NW-19 ④ YC-110 ②
	Rear Cover & Centering Device Yoke Clamp	MP-136							
T3	Horiz. Output	TR-49	FLY-137 * ◆		X162 * ◆	EFR172 * ◆	HO-304 * ◆	FLY-137 * ◆	D-151R * ◆

① Connect as autoformer.
② Use original yoke damping networks. Requires new rear cover, centering device, and yoke clamping device.
③ Connect same as original.
④ Reverse rear mounting bracket and use original mounting bolts.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
8	5		5	5	5	5	5
7	8		6	4	6	6	6
6	7		7	2	7	7	7
1	8		8	1	8	8	8

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	TRAV-LER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T4	16K	3-4Ω	AT-18A	24S54	A-2934	AU-606	A-3581	24S54	S-51X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TRAV-LER PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	SPK-49	4A07	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	TRAV-LER PART No.	FEDERAL PART No	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.200A	SR-14 ①	HF504 ①	SD-500 ①	40K ①	SR500 ②	①Silicon Type.
M2	.200A	SR-14 ①	HF504 ①	SD-500 ②	40K ①	SR500 ②	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		TRAV-LER PART No.	CBS PART No.	SYLVANIA PART No	
M3		SC-1	1N80	1N80	Video Det. (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
M4	Tuner	TA-50	VHF with UHF provisions
M5	Tuner	TA-49	UHF

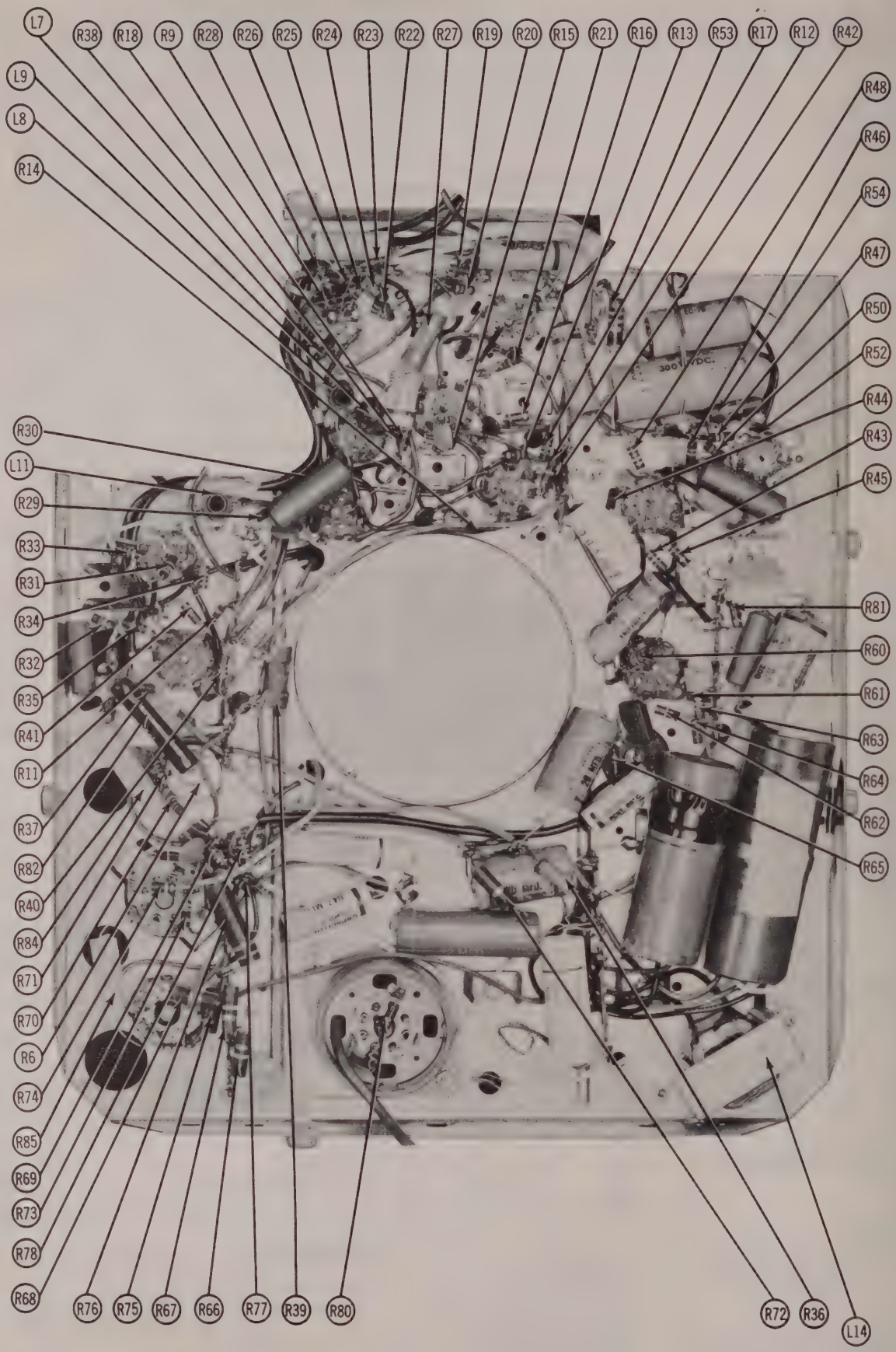
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass & Mask	MP-103	
Knob	K-325	VHF Channel Selector
Knob	K-370	UHF Channel Selector
Knob	K-301	VHF Fine Tuning
Knob	K-369	UHF Fine Tuning
Knob	K-384	Off-On Volume, Contrast, Vert. Hold
Handle	MS-269	
Antenna	L-148	

WIRING DATA

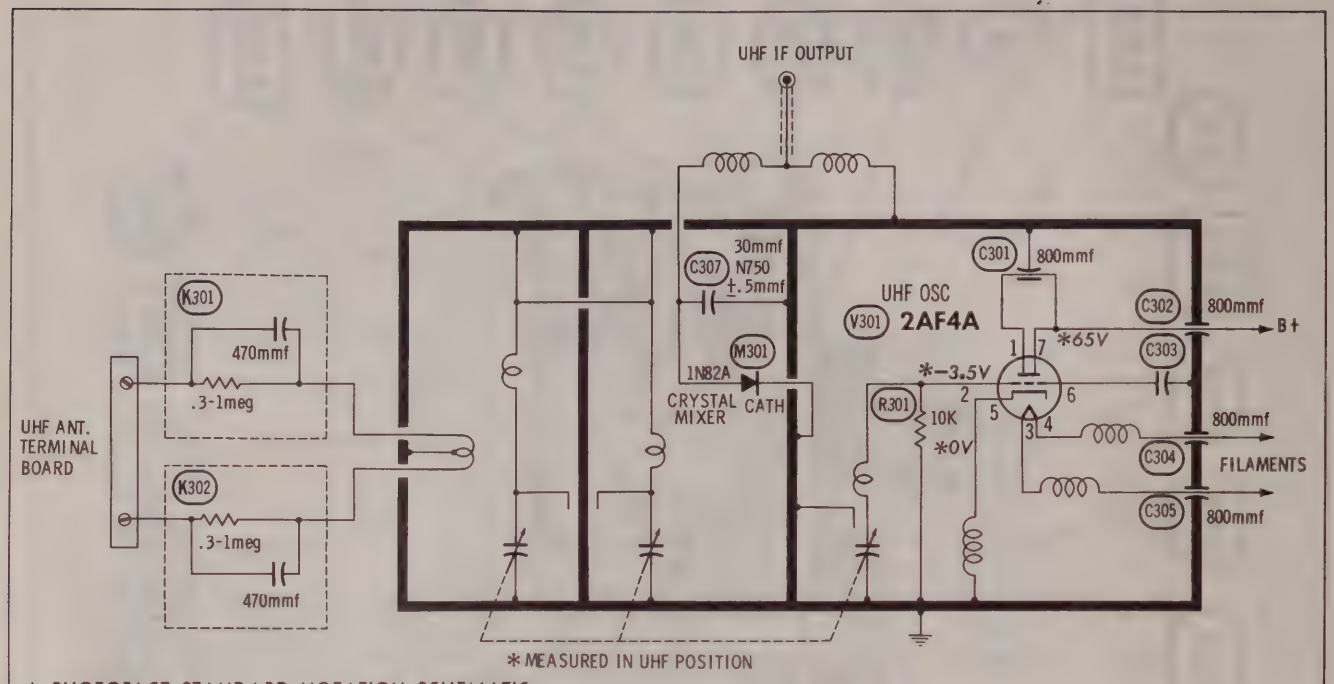
High Voltage Lead	Use BELDEN No. ⬛⬛⬛⬛
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8235
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8484 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

T
K201
C201
K202
MIXER PLATE COIL
C213
C218
C217
R206
R207
R205
C216
A214
C212
A213
U
R203
R204
C204
R201
C203
C205
A215
C206
C207
C208
C219
C211
R202
C210
C209
R208
C214
C215
C202
A216
THRU
A227
C306
A201
THRU
A212

TUNER TA-50



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V301	UHF Osc.	2AF4A	

ITEM No.	USE	TYPE	NOTES

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	TRAV-LER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C301	800				EF-001	MFT-1000			503C-D1	
C302	800				EF-001	MFT-1000			503C-D1	
C303										
C304	800				EF-001	MFT-1000			503C-D1	
C305	800				EF-001	MFT-1000			503C-D1	
C306	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C307	30		N750±.5mmf						5TCU-Q3S±.5mmf*	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		TRAV-LER PART No.	NOTES
	OHMS	WATT		
R301	10K			

ITEM No.	RATING		PART No.	NOTES
	OHMS	WATT		

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	TRAV-LER PART No	REPLACEMENT DATA	
K301	UHF Antenna Isolation	470mmf, .3-1meg		Centralab	RC-471
				Sprague	AC1-1
K302	UHF Antenna Isolation	470mmf, .3-1meg		Centralab	RC-471
				Sprague	AC1-1

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		TRAV-LER PART No.	CBS PART No.	SYLVANIA PART No.	
M301	1N82A		1N82A	1N82A	UHF Mixer (Clip-in)

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A1 thru A10 ..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
Mixer Plate Coil. GENERAL CEMENT #9296, 9297
WALSCO #2546, 2547

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Set Contrast fully counterclockwise.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.0MC (10MC Swp)	41.25MC 42.25MC 45.75MC	Any non-interfering channel	Vert. Amp. thru 10K to point (A). Low side to chassis. (Across Video Det. load)	A1, A2, A3, A4, A5, A6, & Mixer Plate Coil	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. A1 controls low frequency side of curve, A2 and A3 control high frequency side, A4 is adjusted for proper tilt, A5 for MINIMUM dip, A6 to place 41.25MC marker in trap notch and Mixer Plate coil is adjusted for maximum gain.

SOUND IF ALIGNMENT

Tune in a strong TV signal and adjust A7 for maximum undistorted sound. If two peaks occur, connect the DC probe of a VTVM to point (B). Common to chassis.
Adjust to the peak that produces the highest peak on the VTVM.
Reduce the signal strength (by disconnecting the antenna or connecting an attenuator in series with the antenna) until noise is heard in the sound. Adjust A8 and A9 for maximum undistorted sound.
Reduce the signal strength even further and retouch A8 and A9 for maximum undistorted sound.
If necessary, repeat the above procedure.

4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust the Fine Tuning until a 4.5MC beat pattern is visible in the picture. Adjust A10 until the horizontal scanning lines are smooth and continuous.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 6

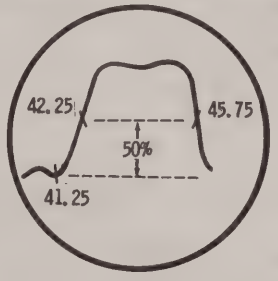
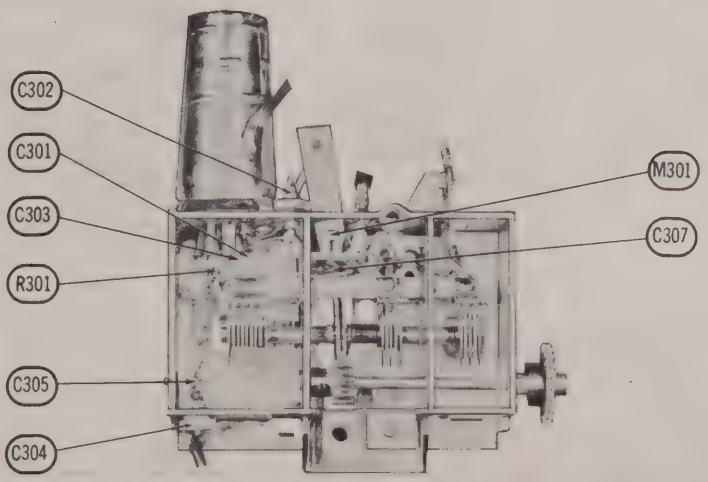


FIG.1



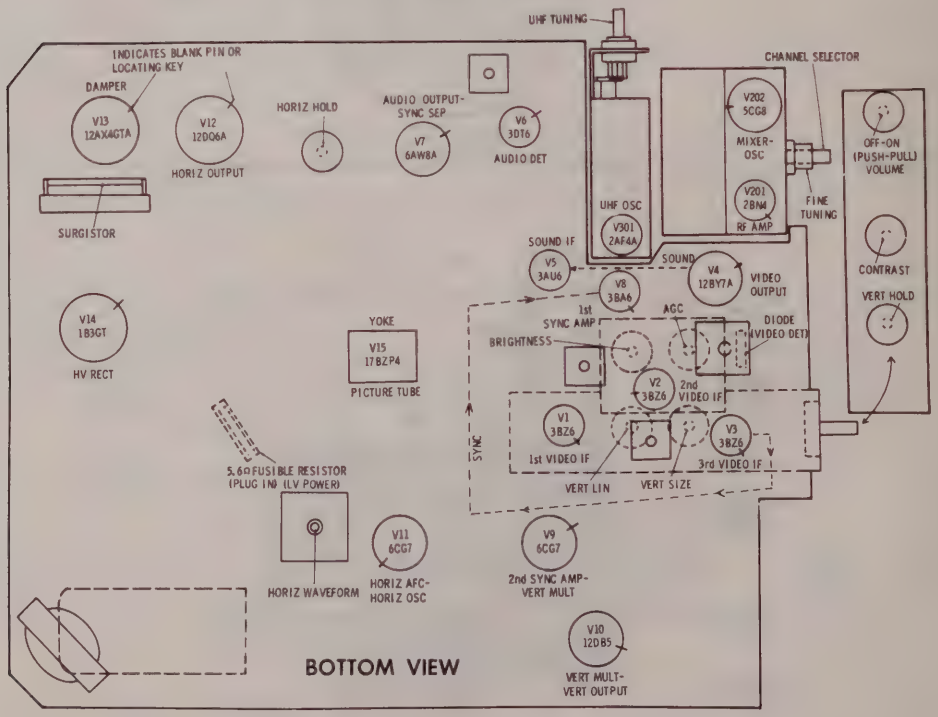
TUNER TA-49

RESISTANCE MEASUREMENTS

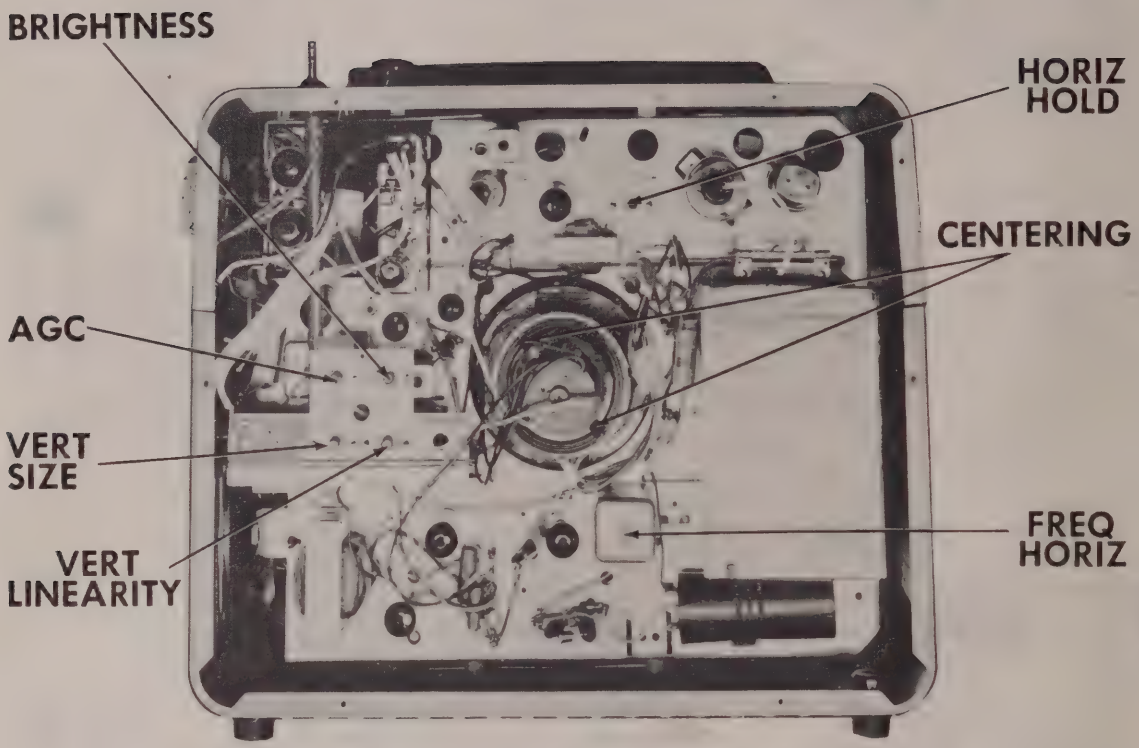
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	1meg	150Ω	8Ω	9Ω	†1500Ω	†1500Ω	0Ω		
V2	3BZ6	1meg	100Ω	9Ω	10Ω	†1500Ω	†1500Ω	0Ω		
V3	3BZ6	.2Ω	180Ω	11Ω	10Ω	†1500Ω	†34K	0Ω		
V4	12BY7A	• 220Ω	1meg	0Ω	5.5Ω	5.5Ω	TP	†6800Ω	†1200Ω	0Ω
V5	3AU6	1.2Ω	0Ω	7.5Ω	7Ω	†50Ω	†1200Ω	560Ω		
V6	3DT6	5.5Ω	680Ω	4.5Ω	4Ω	†270K	†1700Ω	560K		
V7	6AW8A	0Ω	1.8meg	†150K	4.5Ω	5.5Ω	220Ω	0Ω	†33K	†520Ω
V8	3BA6	1.3meg	0Ω	8Ω	7.5Ω	†12K	†1200Ω	0Ω		
V9	6CG7	•†2.5meg	220K	• 190K	13Ω	12Ω	†10K	20K	0Ω	0Ω
V10	12DB5	†18K	•1200Ω	2.2meg	15Ω	13Ω	2.2meg	•1200Ω	NC	†850Ω
V11	6CG7	•†70K	290K	0Ω	12Ω	11Ω	39K	39K	120K	0Ω
V12	12DQ6A	NC	42Ω	TP	†8000Ω	220K	NC	45Ω	0Ω	TOP CAP †10Ω
V13	12AX4GTA	NC	NC	¶	NC	†50Ω	TP	57Ω	60Ω	
V14	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †445Ω
V15	17BZP4	2.5Ω	39K	†150K	0Ω	NC	NC	▪115K	4Ω	
V201	2BN4	0Ω	350K	0Ω	.5Ω	†1700Ω	0Ω	350K		
V202	5CG8	10K	†6800Ω	0Ω	2Ω	.5Ω	†2200Ω	†11K	0Ω	320K
V301	2AF4A	•1200Ω	•10K	2Ω	2.5Ω	•.1Ω	•10K	•1200Ω		
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 275V SOURCE.
‡ MEASURED FROM PIN 3 OF V13.
▪ MEASURED IN UHF POSITION.

NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Adjust for normal picture and sound. Set the Horizontal Hold at the center of its range.

Adjust Horizontal Frequency slug (B1) until the picture synchronizes horizontally.

Connect the vertical amplifier of a scope thru a 10mmf capacitor to point ⓒ and low side to chassis.

Adjust Horizontal Waveform slug (B2) for waveform similar to Fig. 2 with the broad peaks 5% lower than the narrow peaks. While making this adjustment, keep picture synchronized horizontally with B1.

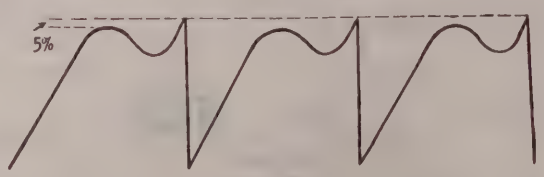


FIG. 2

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PRODUCTION CHANGE BULLETIN 224

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 2 IN SET 406

EMERSON MODELS 1255, 1265, 1267 (CH. 120406G, 120411G) MODEL 1503 (CH. 120429G)

Emerson Models 1276, 1277, 1288, 1289, 1290, 1291 (Ch. 120382H, HC, 120386H, HC, 120383M, MC, 120387M, MC, 120390H, HC, 120391M, MC) were covered in PHOTOFACT Folder 2 - Set 406.

Models 1255, 1265, 1267 (Ch. 120406G, 120411G), and model 1503 (Ch. 120429G) are electrically identical except for the changes given in this bulletin.

COMPONENT CHANGES

R1B (Volume) is changed to Part #390451.

R6 (Vert. Size) is changed to Part #390403.

R5 (Vert. Lin) is changed to Part #390405.

T3 (Horiz. Output) is changed to Part #738138A.

T1 (Vert. Output) is changed to Part #738137.

L12 (Filter Choke) is changed to Part #737033.

The 4" PM speaker is changed to Part #180154.

Picture (14RP4A) is added to Ch. 120410H, 120411G.

R86 is decreased from 22K to 330Ω in Ch. 120406G.

C36 is decreased from .1mfd to .001mmf.

TO CENTER RANGE OF VERTICAL HOLD

R31 is decreased from 680K to 560K. Chassis incorporating this change are coded 120382H (B), 120386H, HC, 120389H, HC (A).

R59 (6Ω Fusible Resistor, Part #397118) is added to Ch. 120428HC, H, 120429GC, G.

Picture Tube (17AVP4) is added to Ch. 120428HC, H, 120429GC, G.

NEW UHF-VHF TUNER ADDED

Late in production UHF-VHF tuner #471024 is used. A schematic showing the new tuner is given on the reverse side.

*****CORRECTION NOTICE*****

RAYTHEON MODELS C-21C1-B, -M, M-21C0-B, -M (CH. 21CT1C)

Raytheon Models C-21C1-B, C-21C1-M, M-21C0-B, M-21C0-M (Ch. 21CT1C) were covered in PHOTOFACT Folder 4 - Set 378.

A correction for replacement data for rectifiers (M1, M2) is given below.

CORRECTION NOTICE

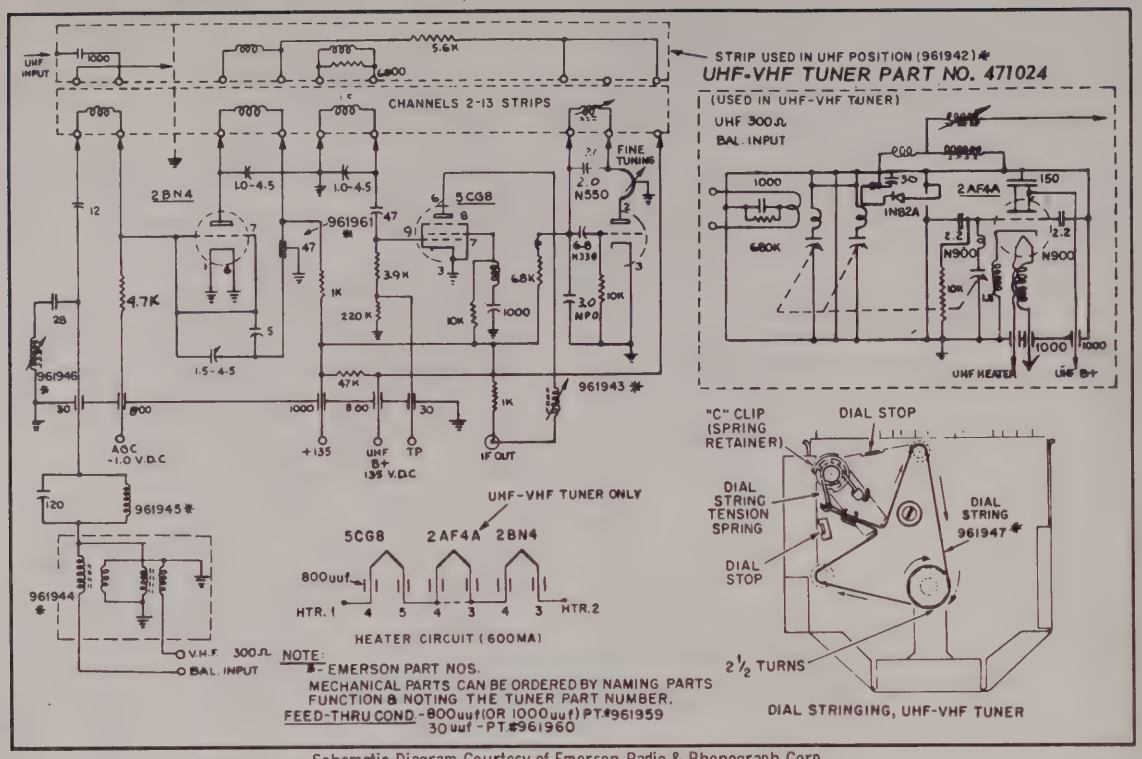
The correct replacement part number for M1 and M2 by International is selenium type #9RS600SL or silicon type #TV-502.

PRODUCTION CHANGE BULLETIN 224

PRODUCTION CHANGE BULLETIN 224

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America



Schematic Diagram Courtesy of Emerson Radio & Phonograph Corp.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 8 IN SET 424

GRANCO MODELS RP-1720, RP-1730

Granco Models HF-1200, RP-1210, RP-1220 and RP-1230 were covered in PHOTOFACT Folder 8 - Set 424.

Models RP-1720 and RP-1730 are electrically identical except for the following addition.

STEREO ADDED

A Stereo Preamplifier and Power Amplifier are added.

A schematic showing this added Stereo Preamplifier and Power Amplifier is given in this bulletin on the reverse side.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 3 IN SET 430

ZENITH CHASSIS 19B20, Q, U, UD

Zenith Models B2329R, RU, RUD, B2330E, EU, EUD, R, RU, RUD, B2335, E, EU, EUD, R, RU, RUD, U, UD, B2358E, EU, EUD, R, RU, RUD, B2359, E, EU, EUD, U, UD, B2360M, MU, MUD, R, RU, RUD, B3010E, H, R, B3011, E, Y, B3012H, R, B3013H, B3014H, R, B4007E, R, B4012, H, R (Ch. 19B20, Q, U, UD) were covered in PHOTOFACT Folder 3 - Set 430.

The following Electrolytic Capacitor replacement data has been added.

REPLACEMENT DATA FOR SPRAGUE ELECTROLYTIC CAPACITORS

The Sprague replacement part number for C1A, B, C, D is #TVL4805.2.

The Sprague replacement part number for C2A, B, C is #TVL3672.2.

The Sprague replacement part number for C3A, B is #TVL2701.5.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 3 IN SET 421

TRUETONE MODELS 2DC3840B, 2DC3841B

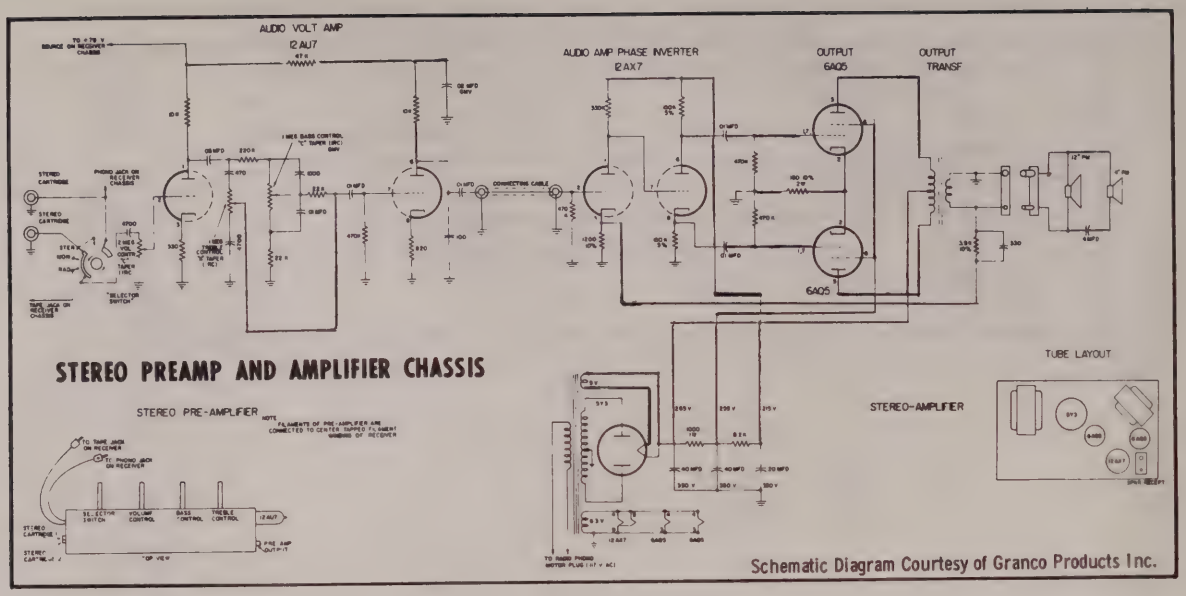
Truetone Model 2DC3840A was covered in PHOTOFACT Folder 3 - Set 421.

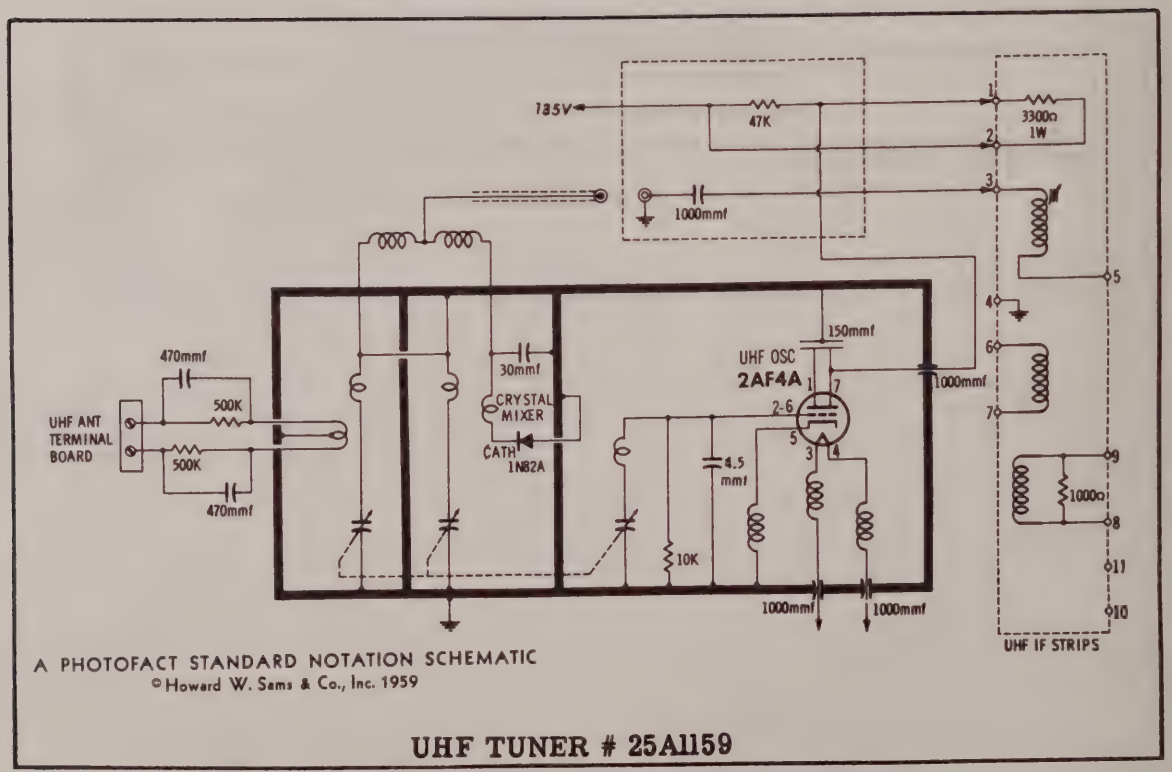
Models 2DC3840B and 2DC3841B are electrically identical except for the following change.

Model 2DC3841B

UHF TUNER ADDED

Model 2DC3841B uses a UHF Tuner, Part #25A1159. A schematic showing this added tuner is given on the reverse side.


AUDIO VOLT AMP
12AU7
AUDIO AMP PHASE INVERTER
12AX7
OUTPUT
6AQ5
OUTPUT
TRANSF
6AQ5
STEREO PREAMP AND AMPLIFIER CHASSIS
STEREO PRE-AMPLIFIER
TUBE LAYOUT
STEREO-AMPLIFIER
Schematic Diagram Courtesy of Granco Products Inc.

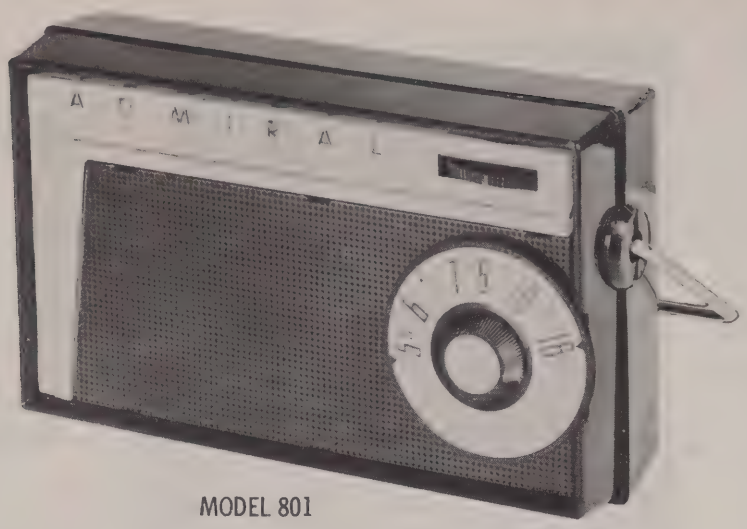

135V
47K
3300Ω
1W
1000mmf
150mmf
UHF OSC
2AF4A
1000mmf
470mmf
500K
500K
470mmf
UHF ANT
TERMINAL
BOARD
30mmf
CRYSTAL
MIXER
CATH
1N82A
4.5
mmf
10K
1000mmf
1000mmf
1000Ω
UHF IF STRIPS
A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1959
UHF TUNER # 25A1159

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER

ADMIRAL MODELS 801, 802, 808 (Ch. 8M1)

ADMIRAL MODELS
801, 802, 808 (Ch. 8M1)



MODEL 801

TRADE NAME	Admiral Models 801, 802, 808 (Ch. 8M1)
MANUFACTURER	Admiral Corp., 3800 W. Cortland St., Chicago 47, Illinois
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	6 Volts DC
RATING	28MA @ 6 Volts DC
TUNING RANGE—BROADCAST	535 - 1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A6 ..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
WALSCO #2531
A4, A5 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400Ω Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1620KC	"	"	A4	"
3.		"	1400KC	1400KC signal	"	A5	Adjust for maximum output while rocking tuning gang.
4.		"	535KC	535KC	"	A6	If signal cannot be tuned in, set A4 1/4 turn from tight and adjust A6 for maximum output at 535KC. Repeat steps 2 and 4 until oscillator covers entire range. Step 2 should be the last performed.

DISASSEMBLY

1. Remove battery compartment cover by sliding button toward cabinet center and lifting cover. Remove batteries.
2. Remove 4 Phillips screws from battery compartment.
3. Remove screw from center of tuning knob. Remove knob.
4. Remove Phillips screw under tuning knob.
5. Remove cabinet front.
6. Close tuning gang. Remove 2 Phillips screws, one near gang, the other in lower left corner (viewed from front).
7. Lift speaker away from chassis. Lift out printed board.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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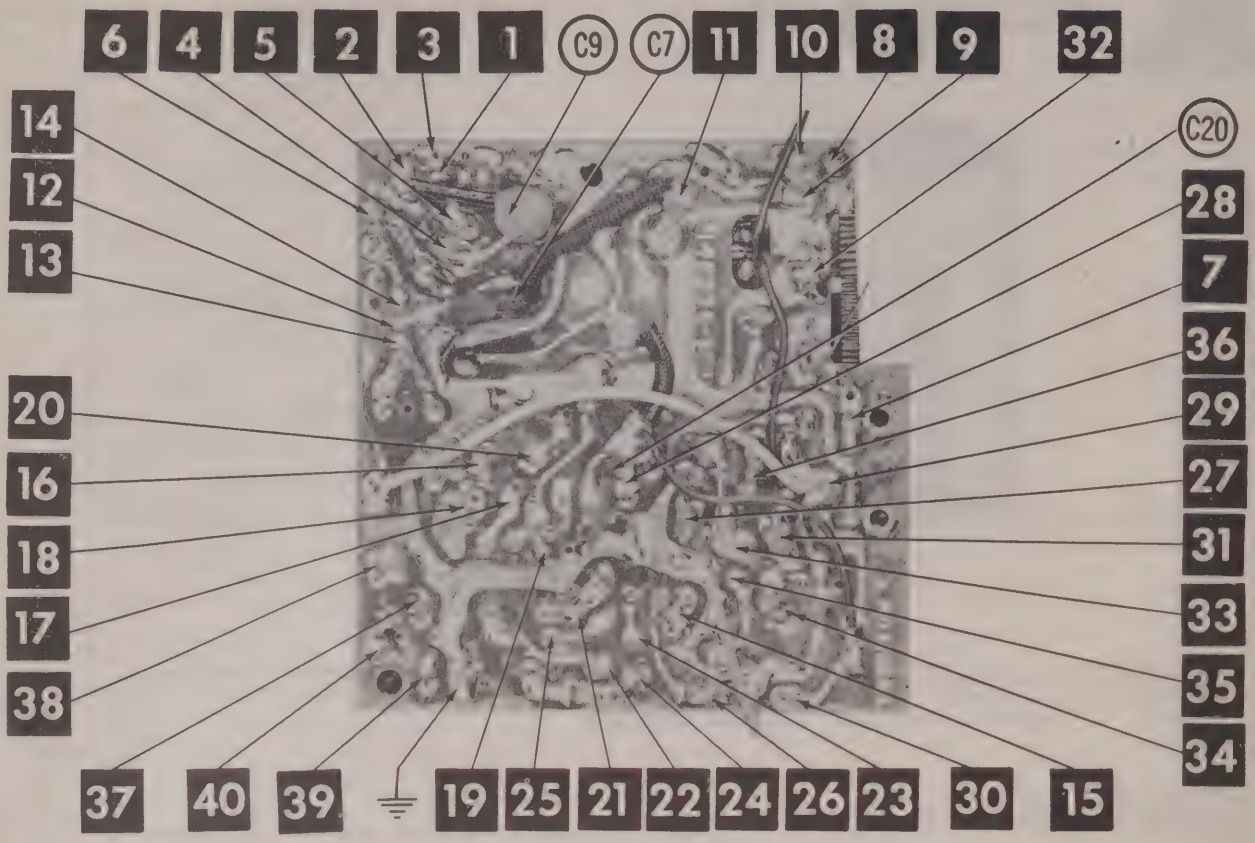
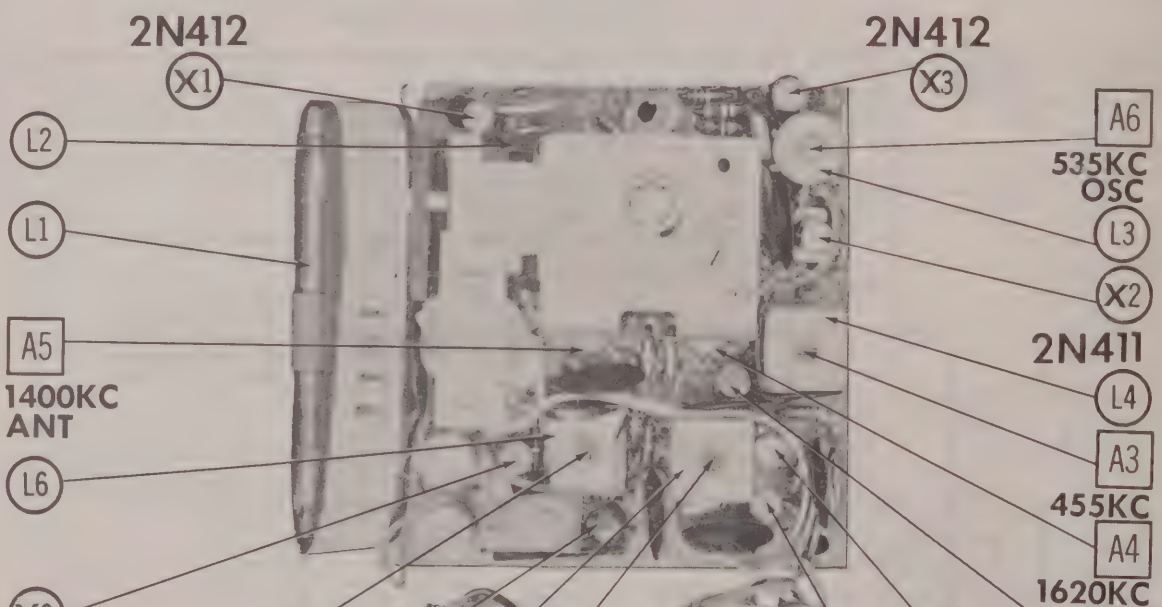
JF202

SET 454 FOLDER 4

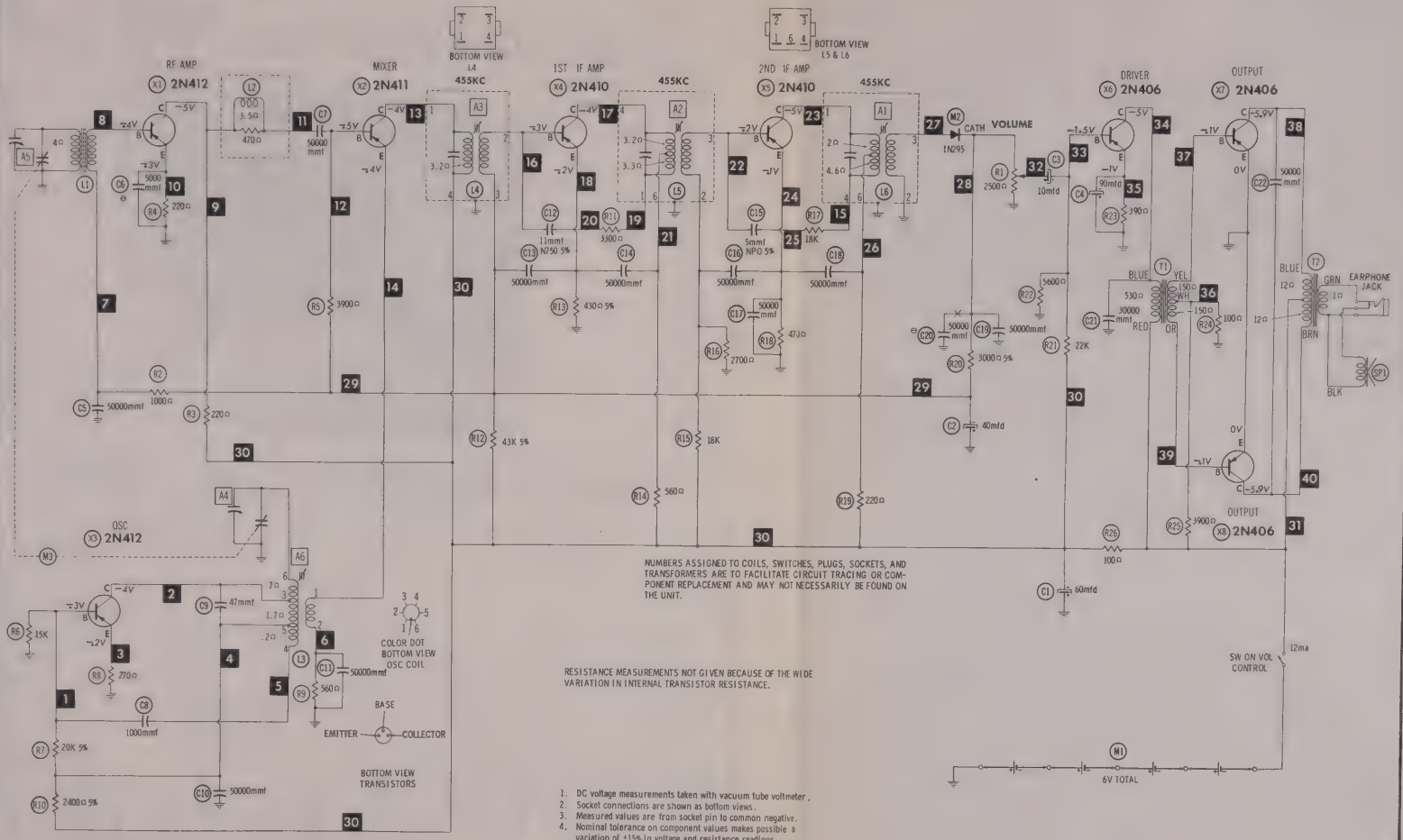


A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD



CHASSIS TOP VIEW - TRANSISTOR, INDUCTOR & ALIGN. IDENT.



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE

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ADMIRAL MODELS
801, 802, 808 (Ch. 8M1)

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N412	RF Amplifier		2N412	2N487	2N412	PNP
X2	2N411	Mixer		2N411	2N486	2N411	PNP
X3	2N412	Oscillator		2N412	2N485	2N412	PNP
X4	2N410	1st IF Amplifier		2N410	2N483	2N410	PNP
X5	2N410	2nd IF Amplifier		2N410	2N483	2N410	PNP
X6	2N406	Driver		2N406	2N362	2N406	PNP
X7	2N406	Output		2N406	2N632	2N406	PNP } Matched
X8	2N406	Output		2N406	2N632	2N406	PNP } Matched

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	60	6	67B32-8	XPP6V60	NLW60-6	PET1260	ML-75-6	TE-1101	
C2	40	3	67B32-9	XPP3V40	NLW40-3	PET140	ML-40-6	TE-1057	
C3	10	3	67B35-6	PWE-3010	EC10-3	TT3X10		TE-1053	
C4	90	10	67B32-10	XPP3V100	NLW100-3	TT3X110	ML-100-3	TE-1060	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	50000			65B45-6	C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C6	5000				C-80V502AM	DM-502	H-05D5	TA-250	TG-D50	①
C7	50000			65B45-6	C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C8	1000			65D10-82	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C9	47			65D10-80	BPD-000047	DD-470	L10Q47	UC-5447	5GA-Q47	
C10	50000			65B45-6	C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C11	50000			65B45-6	C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C12	11		N750 5%	65D10-175			C10Q12U	CN7-412	5TCU-Q11S 10%*	
C13	50000			65B45-6	C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C14	50000			65B45-6	C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C15	5		NPO 5%	65D10-161	NPO-DI 5	DTZ-5	C10V5C		5TCCB-V5S 5%*	
C16	50000			65B45-6	C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C17	50000			65B45-6	C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C18	50000			65B45-6	C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C19	50000			65B45-6	C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C20	50000			65B45-6	C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	②
C21	30000			65B45-8			BYB6S3	GTM-1133	TG-S30	
C22	50000			65B45-6			H-03S5	TA-150	TG-S50	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer. ② Not used in some versions.
① Some versions may use 50000mmf in this application (Part #65B45-6).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2500Ω	½	75B36-1					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ADMIRAL PART No.	NOTES
	OHMS	WATT		
R2	1000Ω		60B45-102	
R3	220Ω		60B45-221	
R4	220Ω		60B45-221	
R5	3900Ω		60B45-392	
R6	15K		60B45-153	
R7	20K 5%		60B44-203	
R8	270Ω		60B45-271	
R9	560Ω		60B45-561	
R10	2400Ω 5%		60B44-242	
R11	3300Ω		60B45-332	
R12	43K 5%		60B44-433	
R13	430Ω 5%		60B44-431	
R14	560Ω		60B45-561	

ITEM No.	RATING		ADMIRAL PART No.	NOTES
	OHMS	WATT		
R15	18K		60B45-183	
R16	2700Ω		60B45-272	
R17	18K		60B45-183	
R18	470Ω		60B45-471	
R19	220Ω		60B45-221	
R20	3000Ω 5%		60B44-302	
R21	22K		60B45-223	
R22	5600Ω		60B45-562	
R23	390Ω		60B45-391	
R24	100Ω		60B8-101	
R25	3900Ω		60B45-392	
R26	100Ω		60B45-101	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		ADMIRAL PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	69C218-5						
L2	RF Choke	73C5-38						Wound on 470Ω
L3	Osc. Coil	69B232-2						
L4	1st IF Trans.	72C182-8						
L5	2nd IF Trans.	72C182-9						
L6	3rd IF Trans.	72C182-10						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1	1	79B67-3						

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	450Ω CT	14-16Ω	79D68-4	TR-18			TA-21	TR-18		

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ADMIRAL PART No.	QUAM PART No.	
SP1	2 3/4"	PM	14-16Ω	78B125-1		

BATTERIES

ITEM No.	VOLTAGE	ADMIRAL PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	6V			Z ①		915 ① E502 ②		M-15F ① RM502R ②	① 4 used. ② Mercury type, 4 used.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ADMIRAL PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N295		1N60	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M3	Tuning Cap. Printed Board	67B67-3 14E236-1	2 Gang (Ant. 123mmf Max., Osc. 78mmf Max.)

CABINETS & CABINET PARTS

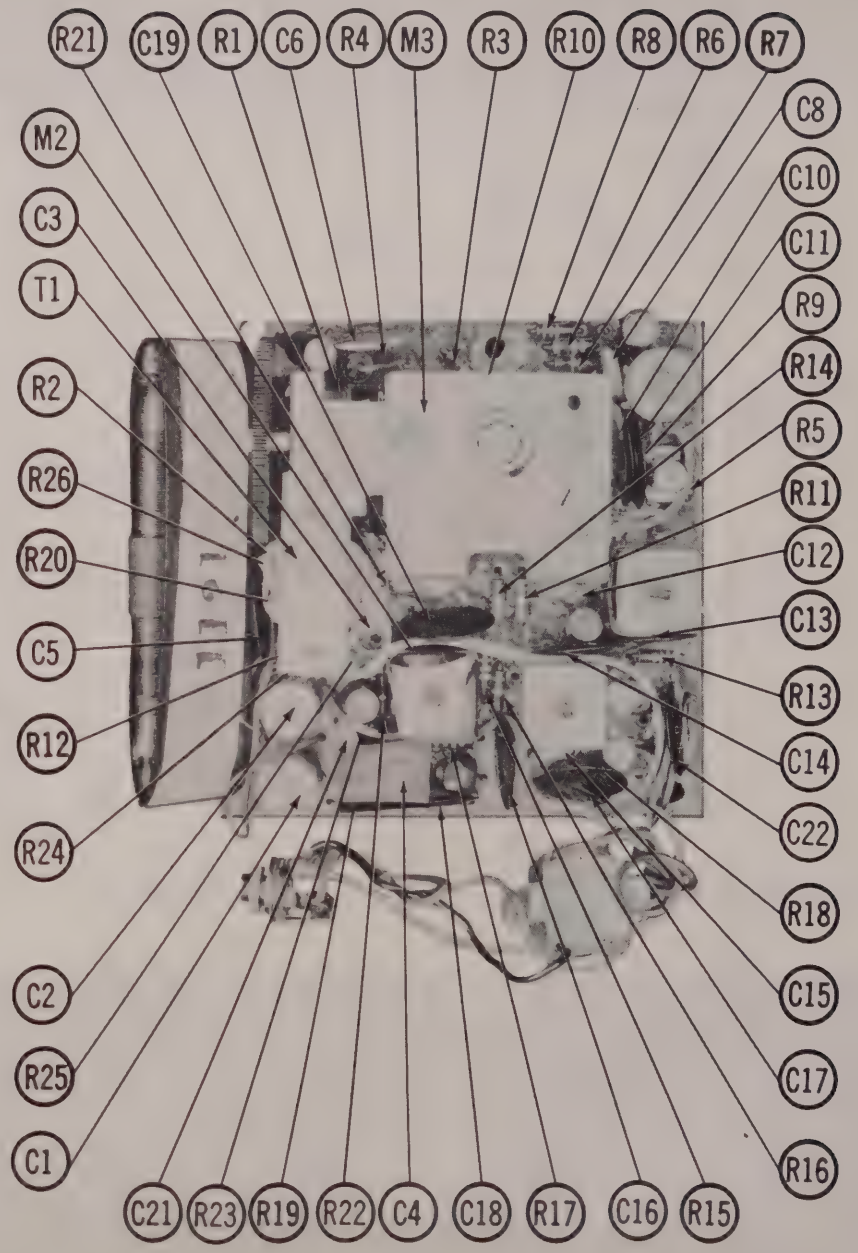
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	33D300-1	Tuning (Small)
Knob	33D300-2	Tuning (Large)
Knob	33C217-2	Volume
Cabinet Front	34E115-12	Black
Cabinet Front	34E115-13	Red
Cabinet Front	34E115-16	Turquoise
Cabinet Back	A7194	Black
Cabinet Back	A7195	Red
Cabinet Back	A7196	Turquoise
Cover	A7197	Battery Compartment, Black
Cover	A7198	Battery Compartment, Red
Cover	A7199	Battery Compartment, Turquoise
Handle	37A155-1	Gold

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

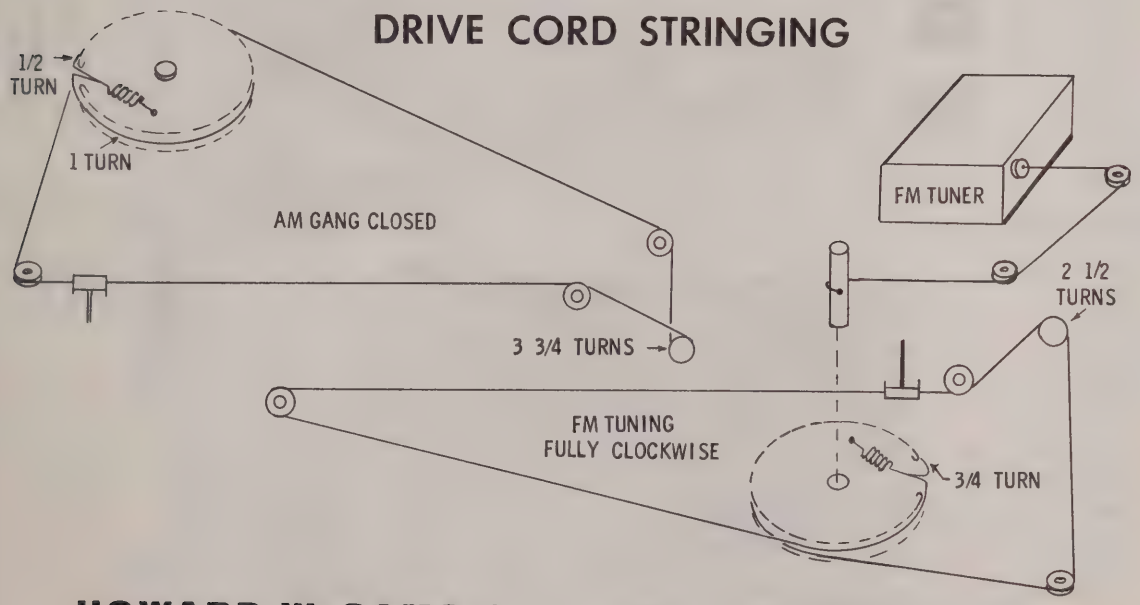
ARVIN MODEL 3586 (Ch. 1.44800)

ARVIN MODEL 3586 (Ch. 1.44800)

TRADE NAME	Arvin Model 3586 (Ch. 1.44800)		
MANUFACTURER	Arvin Industries, Inc., Columbus, Indiana		
TYPE SET	AC Operated 9 Tube FM-AM Receiver		
POWER SUPPLY	105-120 Volts AC, 60 Cycles	RATING	58 Watts, .56 Amp. @ 117 Volts AC (FM or AM)
TUNING RANGE	BROADCAST 540 - 1670KC	FREQ. MOD.	88 - 108MC

ARVIN MODEL 3586 (Ch. 1.44800)

DRIVE CORD STRINGING



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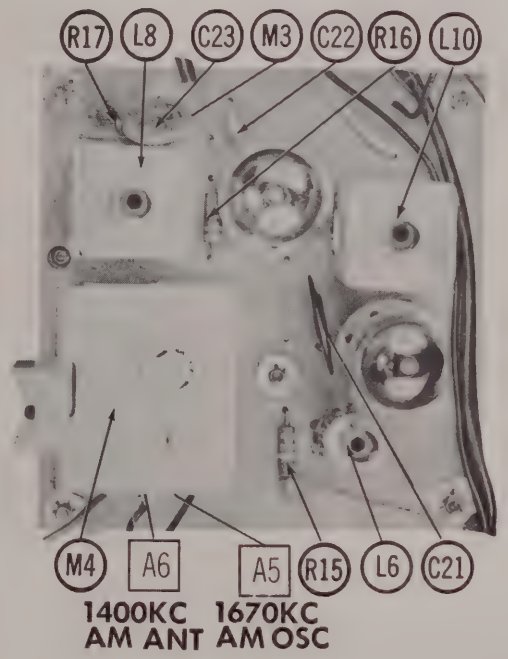
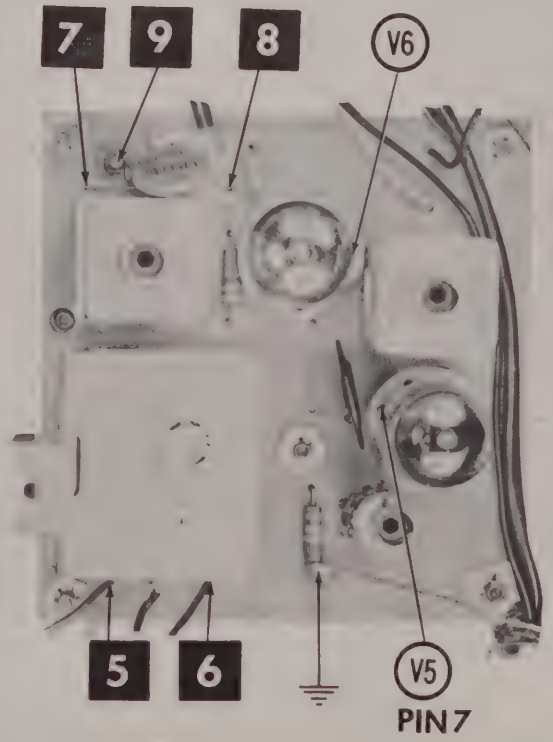
JK142

SET 454 FOLDER 5



AM RF-IF SUB CHASSIS



PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

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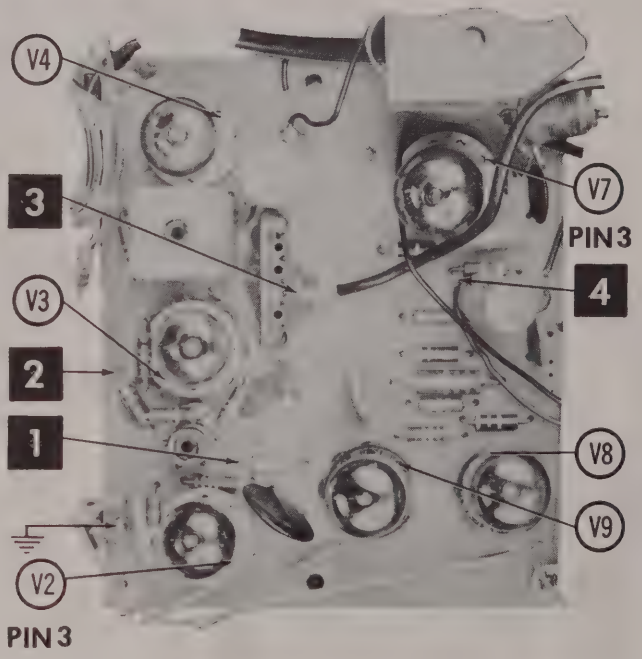

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

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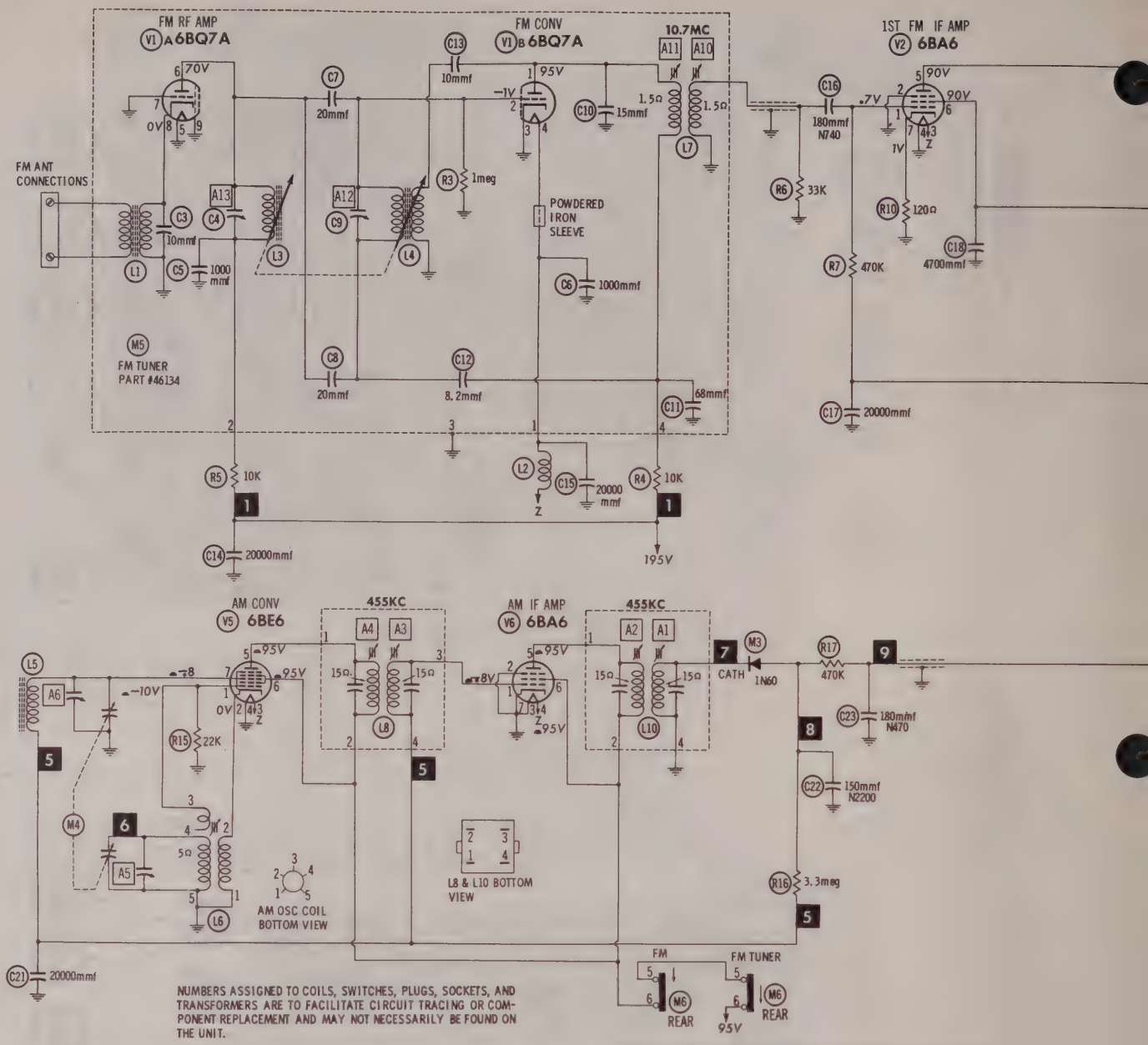
FM RF TUNER

FM IF - AUDIO SUB CHASSIS

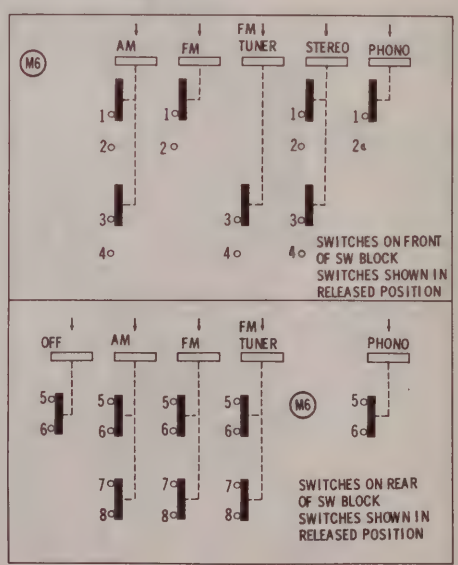


NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BQ7A	††13K	1meg	0Ω	.2Ω	0Ω	††13K	0Ω	0Ω	0Ω
V2	6BA6	1meg	0Ω	.1Ω	0Ω	†1300Ω	†1300Ω	120Ω		
V3	6BA6	575K	0Ω	.1Ω	0Ω	†1300Ω	†1300Ω	100Ω		
V4	6AL5	0Ω	15K	.1Ω	0Ω	1meg	0Ω	1meg		
V5	6BE6	▪22K	.4Ω	.1Ω	0Ω	†▪1000Ω	†▪1000Ω	▪3.8meg		
V6	6BA6	▪3.8meg	0Ω	0Ω	.1Ω	†▪1000Ω	†▪1000Ω	0Ω		
V7	12AX7	††470K	6.8meg	220Ω	0Ω	0Ω	††470K	68K	4700Ω	.1Ω
V8	6AQ5A	540K	180Ω	0Ω	.1Ω	††285Ω	††3300Ω	540K		
V9	6AQ5A	890K	180Ω	0Ω	.1Ω	††285Ω	††3300Ω	890K		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
▪ MEASURED IN "AM" POSITION.
†† MEASURED FROM OUTPUT OF M2.
† MEASURED FROM JUNCTION OF R31 AND C1D.



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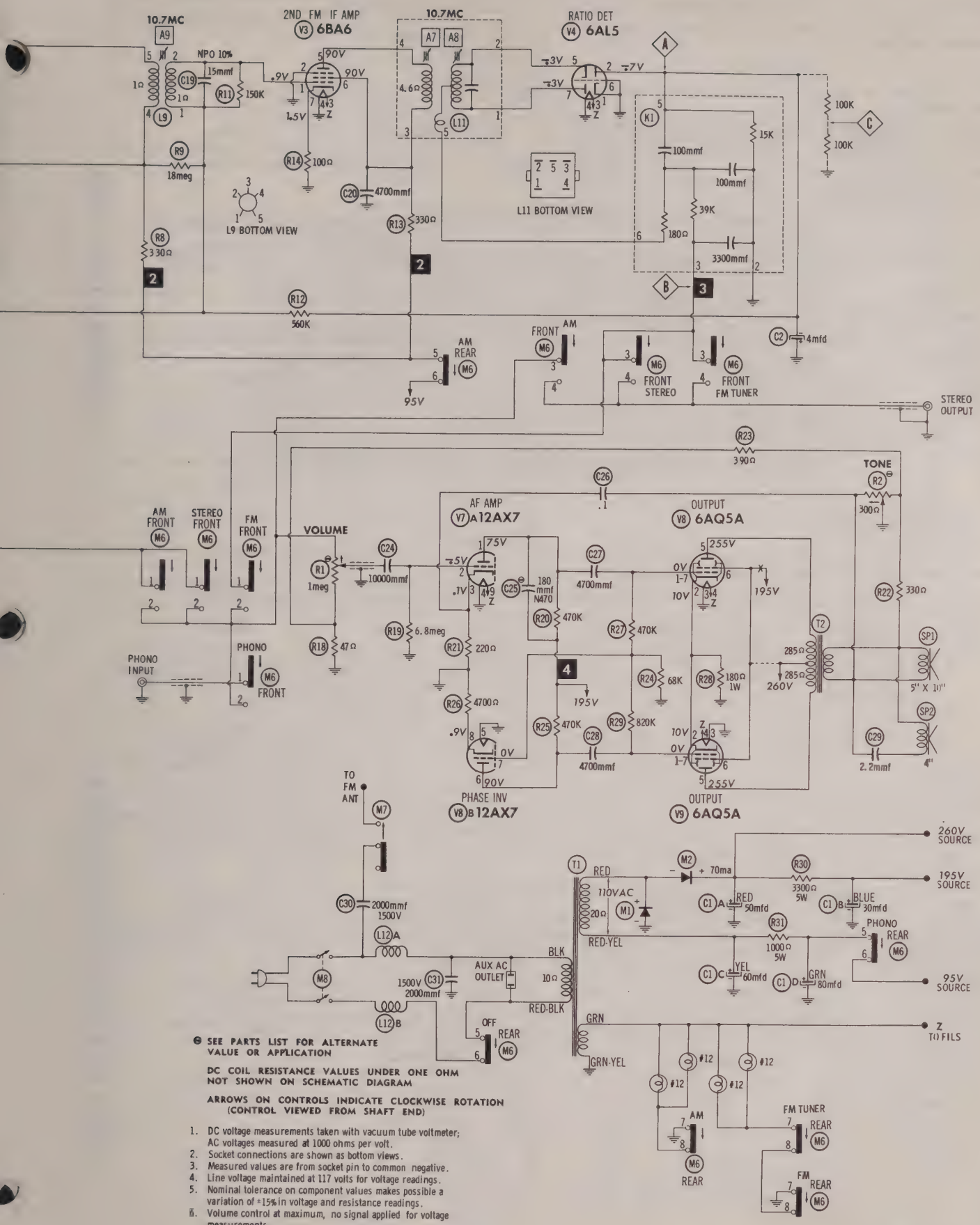


ⓔ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ARVIN MODEL
3586 (Ch. 1.44800)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Suggested Alignment Tools: A1, A2, A3, A4, A7, A9, A10, A11 ..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A5, A6, A12, A13 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05mfd	High side to pin 7 (grid) of AM Converter (V5). Low side to chassis.	455KC (40% Mod.)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1670KC	"	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	"	1400KC	"	A6	Adjust for maximum output. Repeat steps 1, 2 and 3.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100K (±1%) resistors in series from point Ⓐ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
4.	.01mfd	High side to pin 1 (grid) of 2nd FM IF Amp. (V3). Low side to chassis.	10.7MC (Unmod.)	FM	High frequency end of dial	DC probe to point Ⓐ. Common to chassis.	A7	Adjust for maximum deflection.
5.	"	"	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
6.	Two 120Ω Carbon Resistors	Across FM antenna terminals with 120Ω in each lead.	"	"	"	DC probe to point Ⓐ. Common to chassis.	A9, A10, A11	Adjust for maximum deflection.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
4.	.01mfd	High side to pin 1 (grid) of 2nd FM IF Amp. (V3). Low side to chassis.	10.7MC (450KC Swp)	FM	High frequency end of dial	Vert. Amp. to point Ⓐ. Low side to chassis.	A7	Disconnect stabilizing capacitor C2. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
5.	"	"	"	"	"	Vert. Amp. to point Ⓑ. Low side to chassis.	A8	Reconnect C2. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.
6.	Two 120Ω Carbon Resistors	Across FM antenna terminals with 120Ω in each lead.	"	"	"	Vert. Amp. to point Ⓐ. Low side to chassis.	A9, A10, A11	Disconnect stabilizing capacitor C2. Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Reconnect C2.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across FM antenna terminals with 120Ω in each lead.	108.3MC (Unmod.)	FM	High frequency end of dial	DC probe to point Ⓐ. Common to chassis.	A12	Adjust for maximum deflection.
8.	"	"	99MC	"	99MC	"		Adjust tuner string idler tension screw for maximum deflection.
9.	"	"	"	"	"	"	A13	Adjust for maximum deflection.

FIG. 1

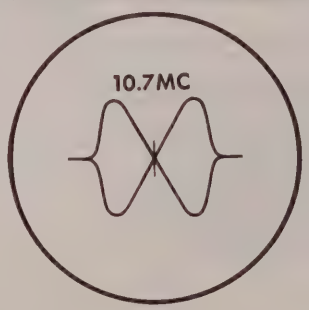


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amp. - FM Conv.	6BQ7A	
V2	1st FM IF Amplifier	6BA6	
V3	2nd FM IF Amplifier	6BA6	
V4	Ratio Detector	6AL5	
V5	AM Converter	6BE6	

ITEM No.	USE	TYPE	NOTES
V6	AM IF Amplifier	6BA6	
V7	AF Amp. - Phase Inv.	12AX7	
V8	Output	6AQ5A	
V9	Output	6AQ5A	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	50	300	44772-3	PR4-450					
B	30	300							
C	60	150							
D	80	150							
C2	4	50	45238-1	BCD50004	ECPB804	PET1935	ML4-50	VL-1303	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	10				SI 10	D6-100	L10Q1	UC-541	5GA-Q1	
C4										
C5	1000				SI 1000	D6-102	L10D1	UC-521	5HK-D1	
C6	1000				SI 1000	D6-102	L10D1	UC-521	5HK-D1	
C7	20				SI 20	D6-200	L10Q2	ZT-542	5GA-Q2	
C8	20				SI 20	D6-200	L10Q2	ZT-542	5GA-Q2	
C9										
C10	15				SI 15	D6-150	L10Q15	UC-5415	5GA-Q15	
C11	68				SI 68	D6-680	L10Q68	UC-5468	5GA-Q68	
C12	8.2				NPO-SI 8.2		C10V82C			
C13	10				SI 10	D6-100	L10Q1	UC-541	5GA-Q1	
C14	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C15	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C16	180		N470							
C17	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C18	4700				BPD-0047	DD-472	BYA10D47	B-247	5HK-D47	
C19	15		NPO 10%		NPO-DI 15	DTZ-15	C10Q15C	CNO-415	5TCC-Q15C	
C20	4700				BPD-0047	DD-472	BYA10D47	B-247	5HK-D47	
C21	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C22	150		N2200							
C23	180		N470							
C24	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C25	180		N470							①
C26	.1	100			P288N-1	DF-104	CUB2P1	GTM101	2TM-D1	
C27	4700				BPD-0047	DD-472	BYA10D47	B-247	5HK-D47	
C28	4700				BPD-0047	DD-472	BYA10D47	B-247	5HK-D47	
C29	2.2				NPO-SI 2.2	DTZ-2R2	C10V22C	CNO-522	5TCCB-V22	
C30	2000	1500		41135-202	HVD-15-2000	DD30-202	HVC20D2	2HV-222	20HKB-D1	
C31	2000	1500		41135-202	HVD-15-2000	DD30-202	HVC20D2	2HV-222	20HKB-D1	

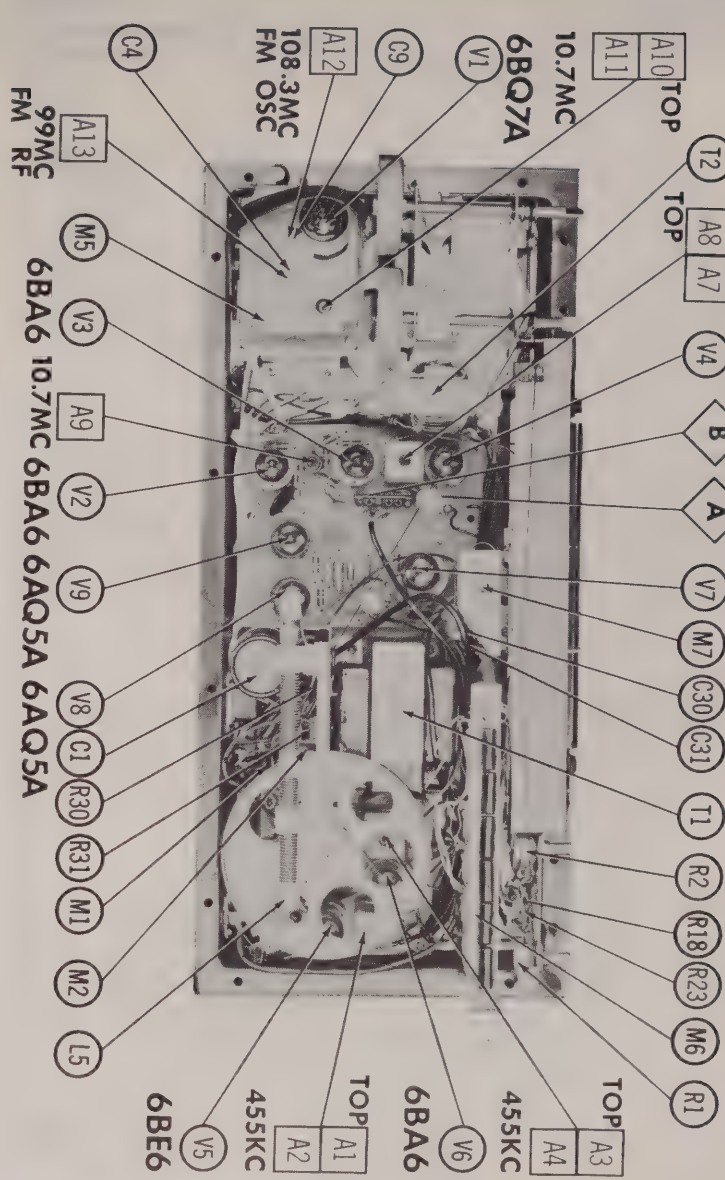
Note 1. Some versions may use 100mmf in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	44500-16 ①	B-70	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2A	300Ω	½	44500-17 ②	B-4	A47-500-S	B11-102	U2	Tone
B	Shaft			Not Req.	FS-3	SK1	Not Req.	

① Some versions may use Part #44500-12 in this application. ② Some versions may use Part #44500-13 in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ARVIN PART No.	NOTES
R3	1meg			
R4	10K			
R5	10K			
R6	33K			
R7	470K			
R8	330Ω			
R9	18meg			
R10	120Ω			
R11	150K			
R12	560K			
R13	330Ω			
R14	100Ω			
R15	22K			
R16	3.3meg			
R17	470K			
R18	47Ω			
R19	6.8meg			
R20	470K			
R21	220Ω			
R22	330Ω			
R23	390Ω			
R24	68K			
R25	470K			
R26	4700Ω			
R27	470K			
R28	180Ω	1		
R29	820K			
R30	3300Ω	5	44448-9	
R31	1000Ω	5	44448-1	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	ARVIN PART No.	REPLACEMENT DATA
K1	Ratio Det. Net.	100mmf, 100mmf, 3300mmf, 180Ω, 15K, 39K	46137	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA ARVIN PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Trans.	†						
L2	Fil. Choke	42761-1						1.2uh
L3	FM RF Coil	†						
L4	FM Osc. Coil	†						
L5	Loopstick	45534-12						
L6	AM Osc. Coil	43644-1						
L7	1st FM IF Trans.	†						
L8	1st AM IF Trans.	44282-1						
L9	2nd FM IF Trans.	45241-2						
L10	2nd AM IF Trans.	44282-1						
L11	Ratio Detector	45240						
L12A	Line Choke	24308-2						2.8uh
B	Line Choke							2.8uh

† Part of Tuner M5.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA ARVIN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .60A	110V @ .340A	6.3V @ 3.3A	46070-1						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ARVIN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	6500Ω CT	6-8Ω	46131-1	24S61	A-2901	AU-600	A-3823	24S61	S-53X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA ARVIN PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	5" x 9"	PM	6-8Ω	46130	57A21Z6.3	
SP2	4"	PM	6-8Ω	46129	4A1TZ6.7	

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA ARVIN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.069A	46140-1	1235AH ① HA154 ②	T100 ① SD94 ②	100AS ① K200 ②	SR200 ②	① Selenium ② Silicon
M2	.069A	46140-2	1234AH ① HA154 ②	T100 ① SD94 ②	100AS① K200 ②	SR200 ②	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA ARVIN PART No.	CBS PART No.	SYLVANIA PART No.	NOTES
M3	1N60	45587	1N60	1N295	AM Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M4	Tuning Cap.	46128	AM, 2 Gang (Ant. 5-262mmf, Osc. 6-92mmf)
M5	Tuner	46134	FM
M6	Switch	46042-1	Function Selector (Pushbutton)
M7	Switch	25525	Antenna (SPDT, Slide Type)
M8	Switch	46209-1	Interlock Switch Assembly

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	45891-29	Black
Knob	46995	Pushbutton
Dial Crystal	45733	
Dial Scale	45977-2	
FM Pointer	46309	
AM Pointer	46704	
Cabinet Base	46609-79	Grey
Cabinet Top	45842-29	Black

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT* Folder with CIRCUITRACE*

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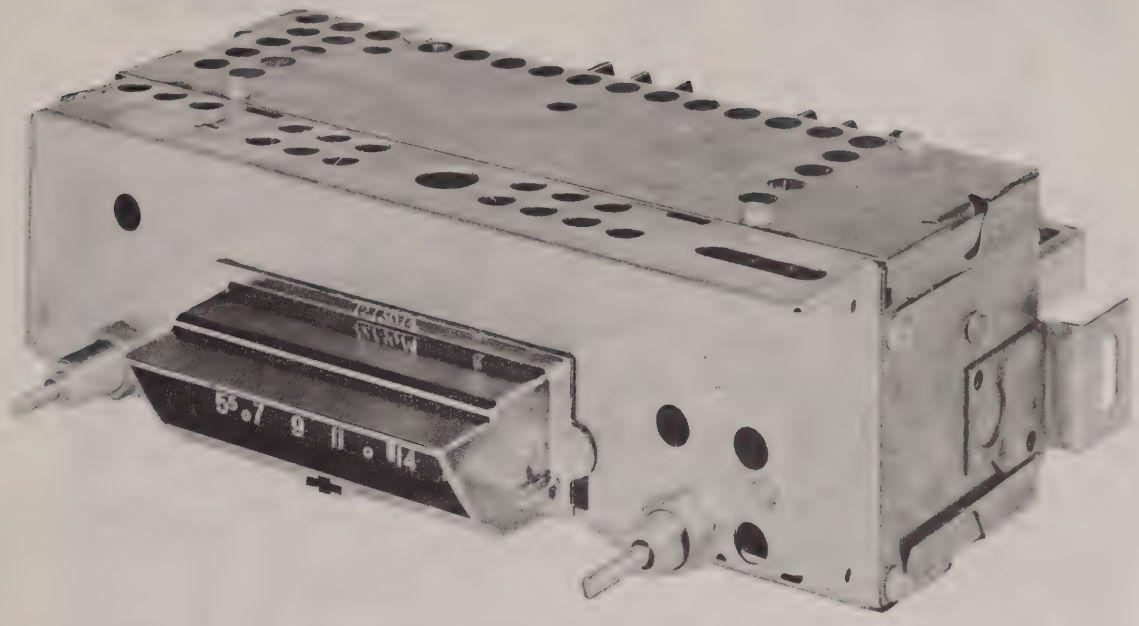
CHEVROLET
MODEL 987888

CHEVROLET
MODEL 987888



TRADE NAME	Chevrolet Model 987888 (For 1959 Chevrolet Automobiles)
MANUFACTURER	Delco Radio Div., G.M. Corp., Kokomo, Ind.
TYPE SET	Battery Operated 4 Tube Custom Built AM Automobile Receiver with Transistorized Output
POWER SUPPLY	12 Volt Storage Battery
TUNING RANGE—BROADCAST	540KC-1615KC

RATING 2.5 Amp. @ 12.6 Volt DC

CHEVROLET
MODEL 987888

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1, A2, A3, A4 .... GENERAL CEMENT #8282, 8606, 8606L, 9091
WALSCO #2526, 2541, 2543, 2544
A5, A9, A10 ..... GENERAL CEMENT #9050L, 9150
WALSCO #2521
A6, A7, A8 ..... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525

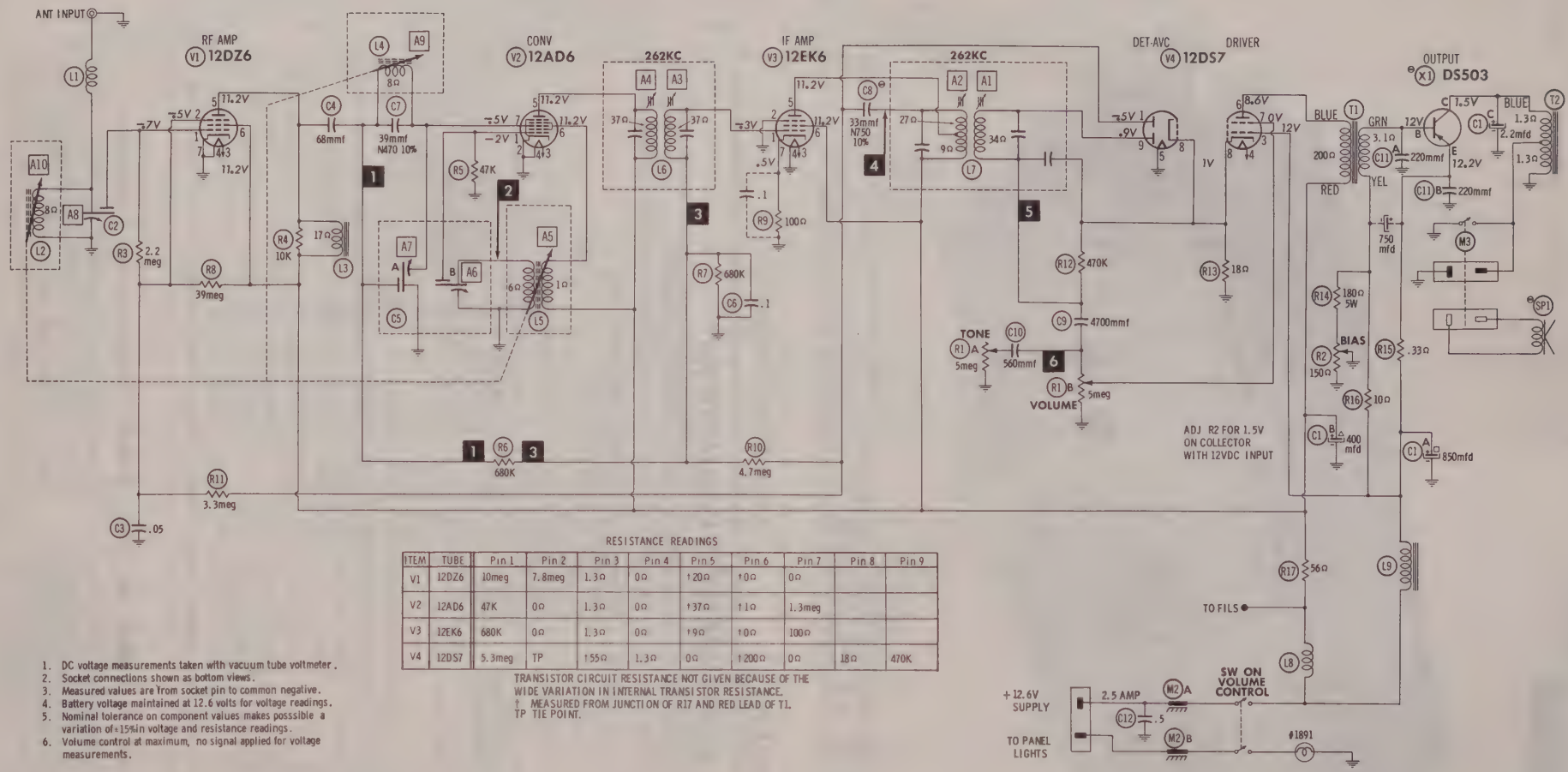
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of converter tube. Low side to chassis.	262KC (400~ Mod)	High Freq. end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
	Check setting of Osc. Coil core (A5). Rear of core should be 1 5/8" from mounting end of coil form.						
2.	82mmf	High side to antenna receptacle. Low side to chassis.	1615KC	High Freq. end stop	Across voice coil	A6, A7, A8	Adjust for maximum output.
3.	"	"	600KC	600KC Signal	"	A9, A10	"
4.	"	"	1615KC	1615KC Signal	"	A7, A8	"
5.	With radio installed in car and antenna fully extended, tune in a weak station near 1100KC and adjust A8 for maximum output.						

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JD276

SET 454 FOLDER 6



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12DZ6	10meg	7.8meg	1.3Ω	0Ω	↑20Ω	↑0Ω	0Ω		
V2	12AD6	47K	0Ω	1.3Ω	0Ω	↑37Ω	↑1Ω	1.3meg		
V3	12EK6	680K	0Ω	1.3Ω	0Ω	↑9Ω	↑0Ω	100Ω		
V4	12DS7	5.3meg	TP	↑55Ω	1.3Ω	0Ω	↑200Ω	0Ω	18Ω	470K

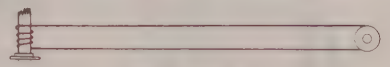
TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
↑ MEASURED FROM JUNCTION OF R17 AND RED LEAD OF T1.
TP TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes posssible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

DIAL CORD STRINGING



8 3/4 TURNS ON TUNING SHAFT

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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CHEVROLET MODEL 987888

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12DZ6	
V2	Converter	12AD6	
V3	IF Amplifier	12EK6	
V4	Det.-AVC-Driver	12DS7	

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	DS503 *	Output				2N677	PNP

* Alternate DS501 (2N278 may be used).

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	■850	16	7273730	AFH3-54-30		WP300.6		TVLS-3021 *	
B	▲400	16							
C	2.2	16VAC							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	DELCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2				7273317						
C3	.05	50		7271670	P285N-05	DD-503	STM1S47	GTM-1147	2EP-S50	
C4	68			6369	BPD-000068	DD-680	L10Q68	CNO-468	5TCC-Q68	
C5A				7273697						
B										
C6	.1	200		7238789	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C7	39		N470 10%	6366						
C8	33		N750 10%		N750-DI 33	TCN-33	C10Q33U	CN7-433	5TCU-Q33S 10% *	①
C9	4700			7271556	BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C10	560			6380	DI-560	DD-561	L10T56	B-356	5GA-T56	
C11A	220			6375	BPD-00022	DD-221	L10T22	B-322	5GA-T22	
B	220				BPD-00022	DD-221	L10T22	B-322	5GA-T22	
C12	.5	100		7269780	P288N-5		CUB2P5	GEM-205	2EP-P50	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
① Some versions may use 100mmf in this application (Part #7272725).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	5meg	1/2	1221260				■ UE3990S	Tone
B	5meg	1/2						Volume
C	Switch							Power On-Off
R2	150Ω	1/2	7273731		39-150		FL-150	Bias

■ "STA-LOC" Equivalent: FH56A, RU56A, OS1125, IS1562, US-42.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		DELCO PART No.	NOTES
	OHMS	WATT		
R3	2.2meg		1239	
R4	10K		1137	
R5	47K		1219	
R6	680K		1233	
R7	680K		1233	
R8	39meg		7273602	
R9	100Ω			
R10	4.7meg		1243	

ITEM No.	RATING		DELCO PART No.	NOTES
	OHMS	WATT		
R11	3.3meg		1241	
R12	470K		1231	
R13	18Ω		1104	
R14	180Ω	5	7273734	
R15	.33Ω		7274329	Fuse Type
R16	10Ω		1101	
R17	56Ω		1110	

PRINTED BOARD

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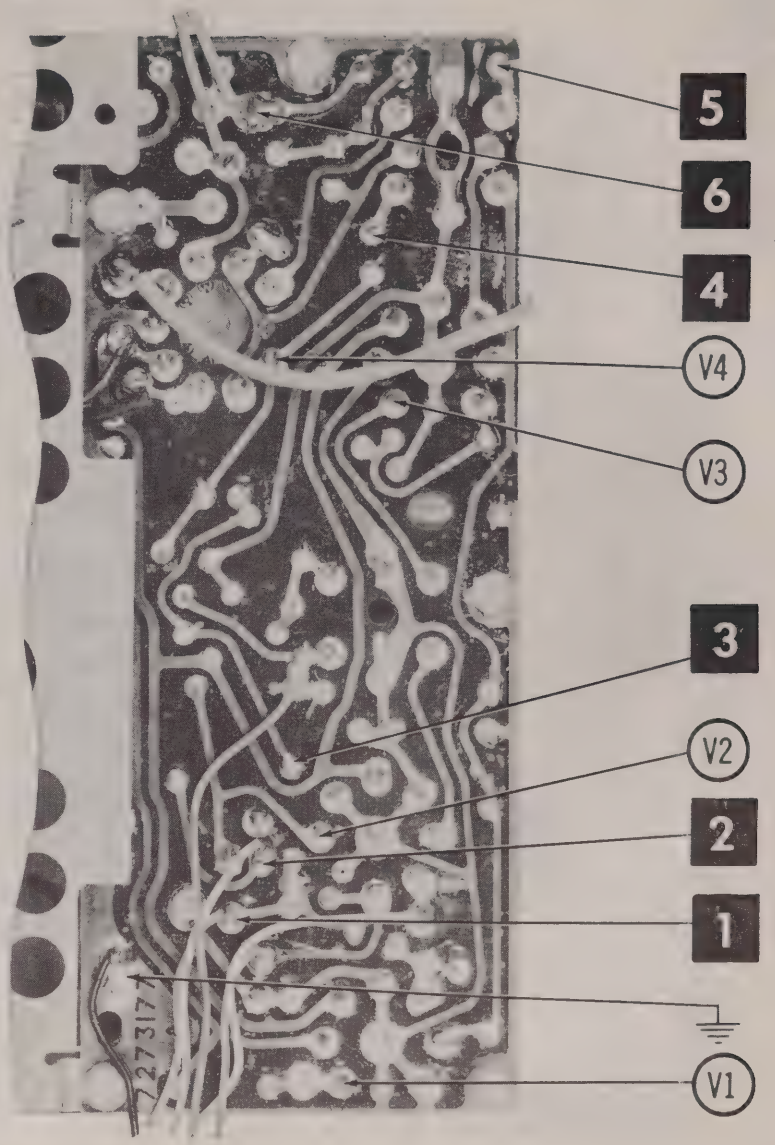
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		DELCO PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Ant. Coil	7255738	19-1004	19-1004	BC-565	4610		
L2	Ant. Coil	1221138						
L3	RF Choke	7269684						
L4	RF Coil	1221138						
L5	Osc. Coil	1221263						
L6	Input IF	1221257	16-6756	16-6756	BC-344	13-PH1		
L7	Output IF	1221255						
L8	Fil. Choke	1217846						

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~)	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L9	.7A	.8Ω	.008 Hy.	7273425						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	6	1	7273406						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE	REPLACEMENT DATA							NOTES
	Pri.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	9Ω tap @ 3-4Ω	7273199							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	DELCO PART No.	QUAM PART No.	
SP1	6" x 9"	PM	3-4Ω	7273271 ①	69A3	① Alternate Part #7272731
	6" x 9"	PM	3-4Ω	7272731 ①		

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			DELCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1		4A 32V	148511					

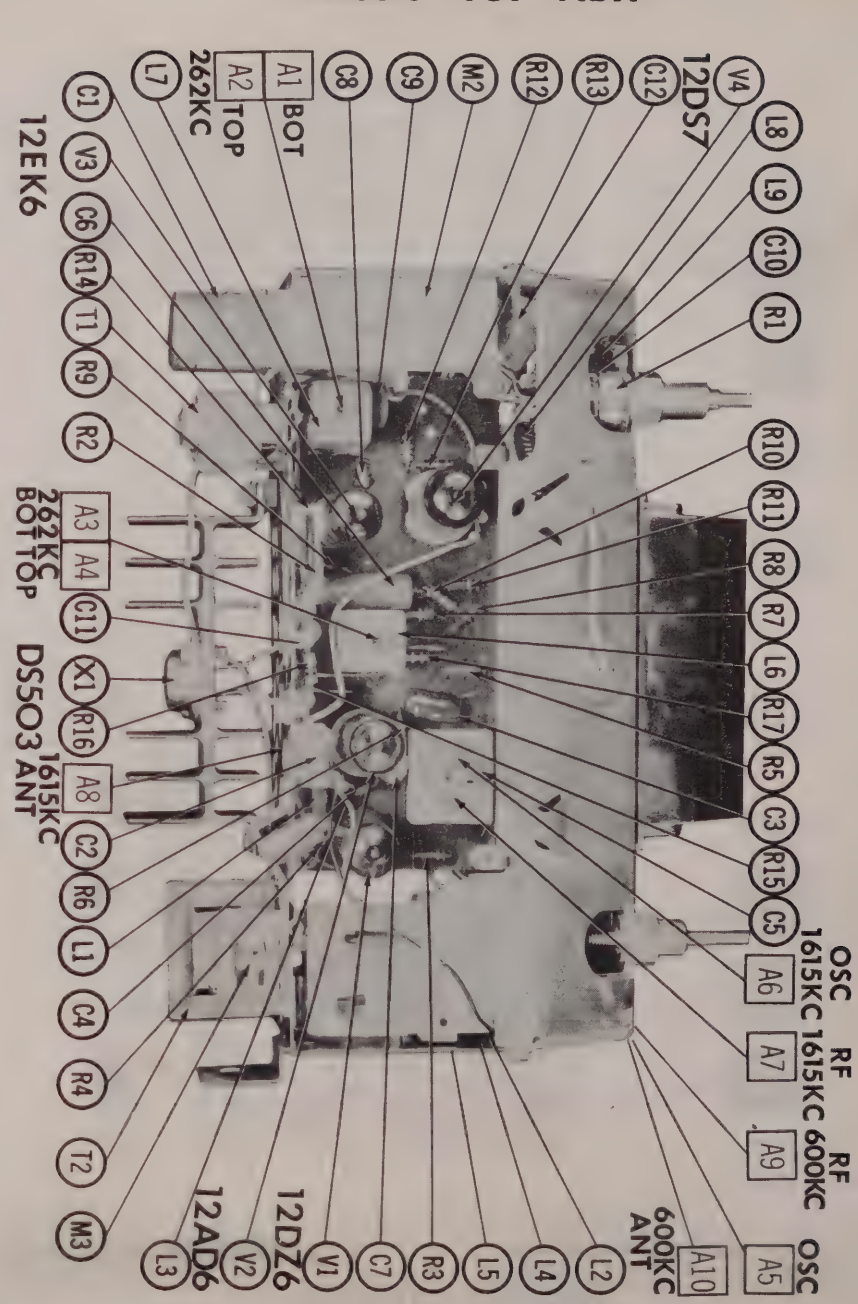
MISCELLANEOUS

ITEM No.	PART NAME	DELCO PART No.	NOTES
M2	Spark Plate	1220885	Two Section, Dial Light & "A" Lead
M3	Switch	7271424	Speaker Interlock
	Printed Board	7273177	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661

CHASSIS—TOP VIEW



PHOTOFACT* Folder

CIRCUITRACE*

CONTINENTAL MODEL M-650

CONTINENTAL
MODEL M-650

CONTINENTAL
MODEL M-650

TRADE NAME	Continental Model M-650
IMPORTER	Continental Merchandise Co., Inc., 236 Fifth Ave., New York 1, N. Y.
TYPE SET	AC-DC-Battery Operated 4 Tube Portable AM Receiver
POWER SUPPLY	110-120 Volts AC (or) 1.5 Volts DC "A" Supply & 67.5 Volts DC "B" Supply
RATING	11 Watts, .17 Amp. @ 117 Volts AC (or) 220MA @ 1.5 Volts DC & 12MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	535 - 1605KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Suggested Alignment Tools:

A1, A2, A3, A4 ..... GENERAL CEMENT #8271, 8273, 8275, 8276, 8721, 8722, 9150, 9298, 5003
WALSCO #2516, 2519

A5, A6 ..... GENERAL CEMENT #5000, 5003, 5014, 5015, 5016, 8276, 8290
WALSCO #2512, 2515, 2522, 2523, 2525, 2537

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1605KC	"	"	A5	"
3.		"	1400KC	1400KC	"	A6	"

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JF206

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	1R5	
V2	IF Amplifier	1T4	
V3	Det. -AVC - AF Amp.	1U5	
V4	Output	3S4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Continental PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	40	130						TVAS-3420.5*	
B	40	130							
C	150	10							
C2	100	10		SRE12V100	BBR100-15	TT15X100	TD-100-15	TVA-1130	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	Continental PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.002	600			P688N-002	D6-202	CUB6D2	GEM-622	6TM-D2	
C4	.02	400			P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C5	50				SI 50	D6-500	L10Q5	UC-545	5GA-Q5	
C6	2000				BPD-002	DD-202	BYA10D2	B-220	5HK-D2	
C7	100				SI 100	D6-101	L10T1	UC-531	5GA-T1	
C8	100				SI 100	D6-101	L10T1	UC-531	5GA-T1	
C9	100				SI 100	D6-101	L10T1	UC-531	5GA-T1	
C10	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C11	.002	600			P688N-002	D6-202	CUB6D2	GEM-622	6TM-D2	
C12	.002	600			P688N-002	D6-202	CUB6D2	GEM-622	6TM-D2	
C13	2000				BPD-002	DD-202	BYA10D2	B-220	5HK-D2	
C14	.01	400			P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C15	.05	400			P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C16	.01	400			P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Continental PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1meg	½						Volume & Switch

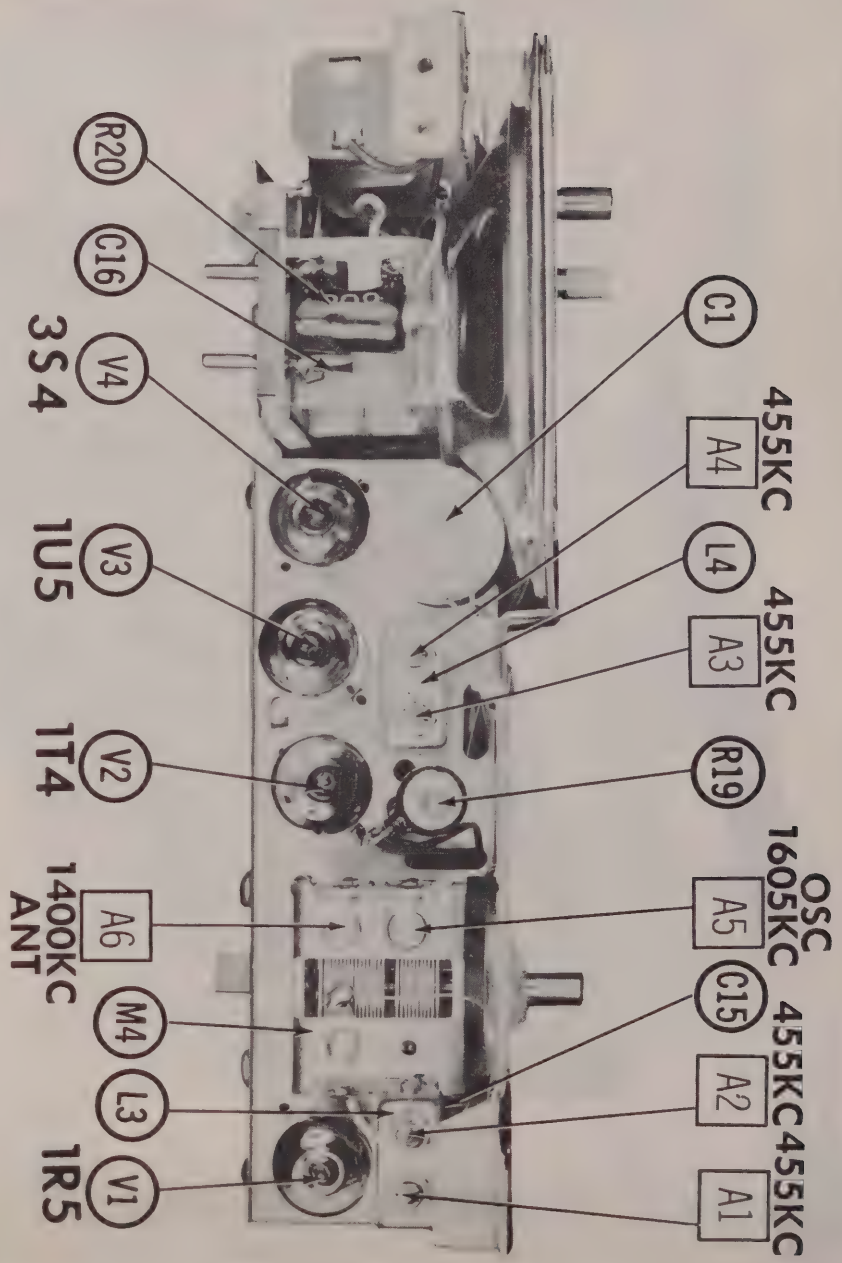
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Continental PART No.	NOTES
	OHMS	WATT		
R2	100K			
R3	5meg			
R4	47K			
R5	1meg			
R6	4.7meg			
R7	4.7meg			
R8	1meg			
R9	3.3meg			
R10	3000Ω			
R11	300Ω			
R12	1500Ω			

ITEM No.	RATING		Continental PART No.	NOTES
	OHMS	WATT		
R13	820K			
R14	470Ω			
R15	3000Ω			
R16	10K			
R17	390Ω			
R18	1300Ω			
R19A	50Ω			
B	1600Ω	10		
C	250Ω			
R20	80Ω	3		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		Continental PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1 L2 L3 L4	Loopstick Osc. Coil Input IF Output IF							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Continental PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3600Ω	4-6Ω		24S48 ①	A-3026 ①		A-3328 ①	24S48 ①	S-6X ①	① Use original channel frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Continental PART No.	QUAM PART No.	
SP1	3½"	PM	4-6Ω		3A07	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	Continental PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.068A		HA154 ②	T075 ① SD-94 ②		F4 ②	① Selenium Type ② Silicon Type

BATTERIES

ITEM No.	VOLTAGE	Continental PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M2	1.5V		2R		A100		M-13R RM-42R ①		① Mercury Type
M3	67.5V			P45		477		M-211R	

MISCELLANEOUS

ITEM No.	PART NAME	Continental PART No.	NOTES
M4	Tuning Cap.		2 Gang; Ant. 6-201mmf, Osc. 7-98mmf
M5	Switch		AC-DC-Battery (Rotary, Pushbutton Type)
M6	Switch		Battery Charge-Receive (DPDT, Slide Type)

CABINETS & CABINET PARTS

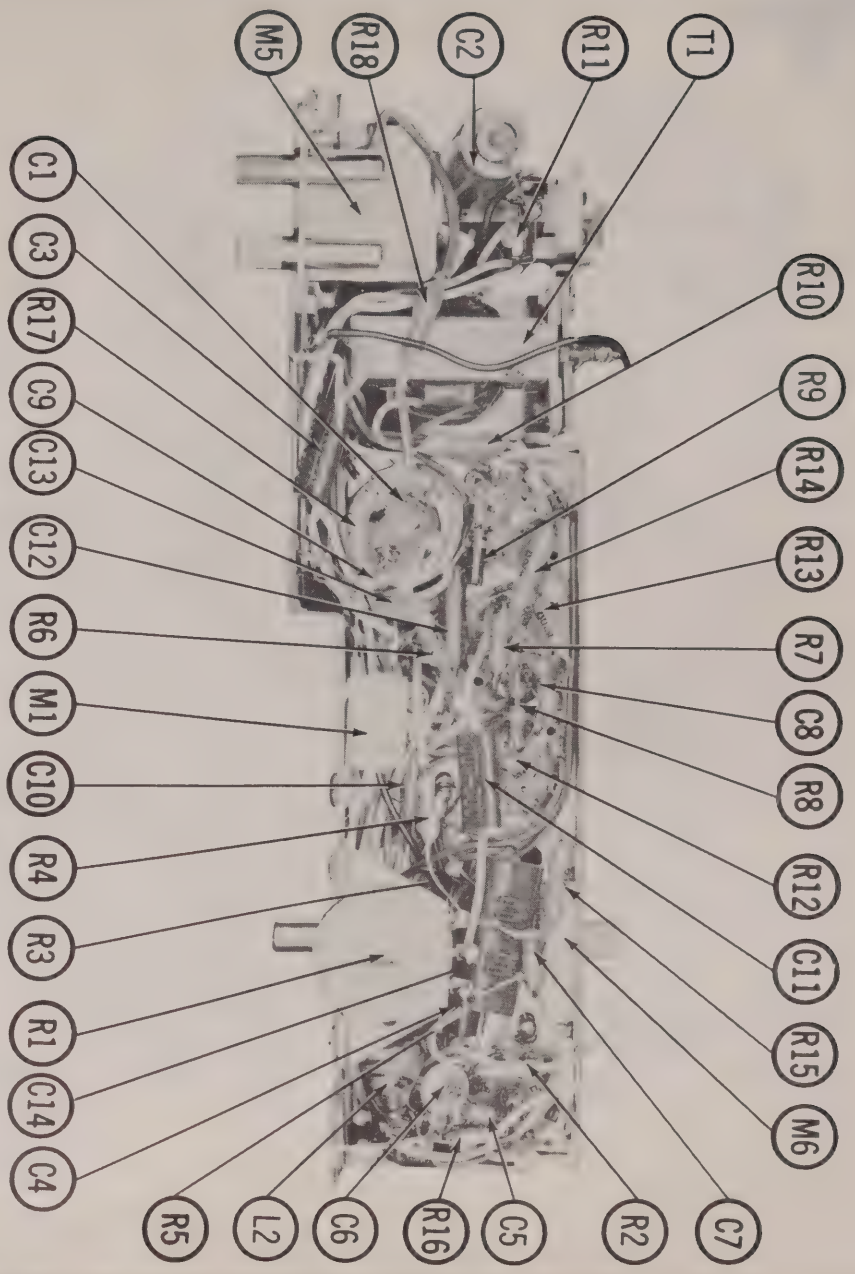
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

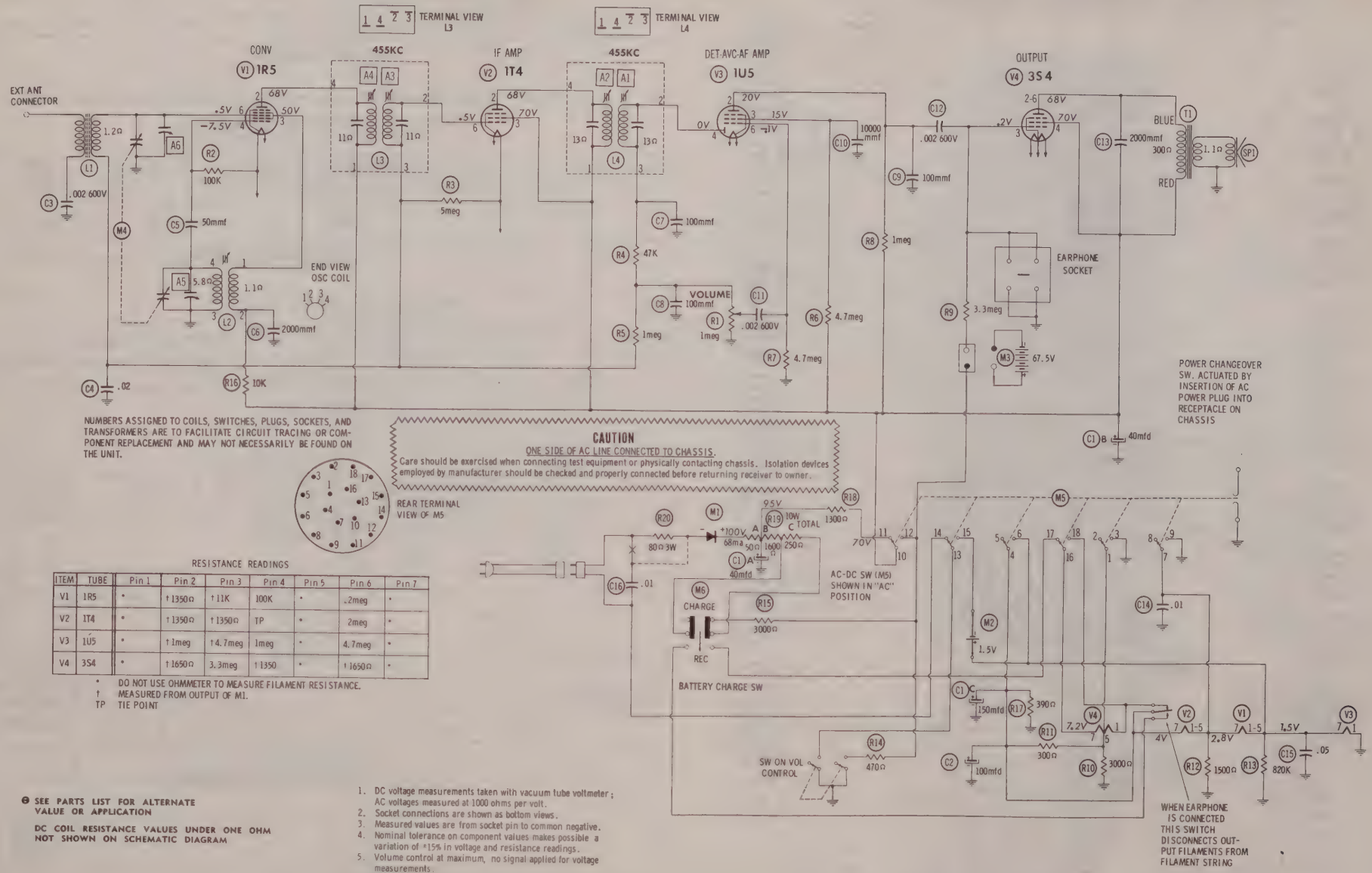
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS BOTTOM VIEW





NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1R5	*	†1350Ω	†11K	100K	*	.2meg	*
V2	1T4	*	†1350Ω	†1350Ω	TP	*	2meg	*
V3	1U5	*	†1meg	†4.7meg	1meg	*	4.7meg	*
V4	3S4	*	†1650Ω	3.3meg	†1350	*	†1650Ω	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM OUTPUT OF M1.
TP TIE POINT

❸ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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CONTINENTAL MODEL M-650

PHOTOFACT* Folder

EIA MEMBER

**EXCEL
MODEL XL-3**

EXCEL
MODEL XL-3

EXCEL
MODEL XL-3

TRADE NAME	Excel Model XL-3
IMPORTER	Excel Corp. of America., 9 Rockefeller Plaza, New York 20, N.Y.
TYPE SET	AC-DC Battery Operated 4 Tube Portable AM Receiver
POWER SUPPLY	110-120 Volts AC (or) 1.5 Volts DC "A" Supply & 67.5 Volts DC "B" Supply
RATING	11 Watts, .17 Amp. @ 117 Volts AC (or) 260MA @ 1.5 Volts DC & 14MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	535KC-1605KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A4, A6... GENERAL CEMENT #8721, 8722
WALSCO #2519
A5, A7..... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to antenna lug at tuning gang. Low side to chassis.	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1605KC	"	"	A5	"
3.	"	"	600KC	"	"	A6	"
4.		Loop	1400KC	"	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JF151

SET 454 FOLDER 8

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	1R5	
V2	IF Amplifier	1T4	

ITEM No.	USE	TYPE	NOTES
V3	Det. -AVC-AF Amp.	1U5	
V4	Output	3S4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	EXCEL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■40	150							
B	▲40	150							
C	▲200	25		PRS12V100	BBR100-15	TT15X100	TD-100-15	TVA-1130	①
C2	100	10							

① Not used in some versions.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	EXCEL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.02	400			P485N-02	DD-203	BYB6S2	GTM-412	4EP-S20	
C4	2000				BPD-002	DD-202	BYA10D2	B-220	5HK-D2	
C5	60				SI 56	D6-560	L10Q56	UC-5456	5GA-Q56	
C6	100				SI 100	D6-101	L10T1	UC-310	5GA-T1	
C7	100				SI 100	D6-101	L10T1	UC-310	5GA-T1	
C8	.002	600			P685N-002	DD-202	BYA10D2	GTM-622	6EP-D20	
C9	1000				SI 1000	D6-102	BYA10D1	UC-210	5HK-D1	
C10	.01	400			P485N-01	DD-103	BYA10S1	GTM-411	4EP-S1	
C11	.002	600			P685N-002	DD-202	BYA10D2	GTM-622	6EP-D2	
C12	.002	600			P685N-002	DD-202	BYA10D2	GTM-622	6EP-D2	
C13	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C14	.05	400			P485N-05	DF-503	STM4S47	GTM-415	4EP-S5	
C15	.01	400			P485N-01	DD-103	BYA10S1	GTM-411	4EP-S1	①
C16	.01	400			P485N-01	DD-103	BYA10S1	GTM-411	4EP-S1	

① Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	EXCEL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1meg	½						Volume & Switch

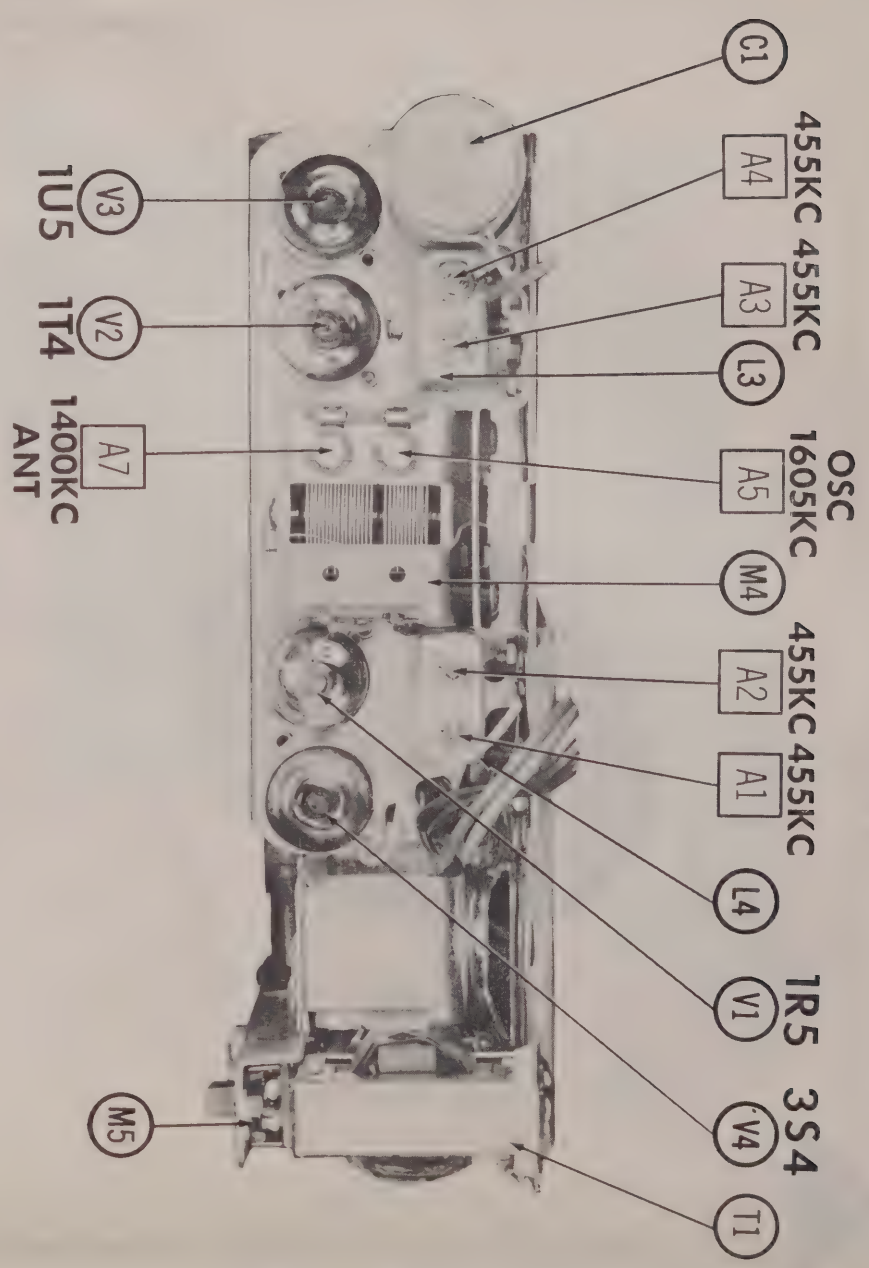
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		EXCEL PART No.	NOTES
	OHMS	WATT		
R2	100K			
R3	10K			
R4	3.3meg			
R5	47K			
R6	4.7meg			
R7	1meg			
R8	4.7meg			
R9	3.3meg			
R10	470Ω			

ITEM No.	RATING		EXCEL PART No.	NOTES
	OHMS	WATT		
R11	1300Ω			
R12	3000Ω			
R13A	250Ω			
B	1600Ω	10		
C	50Ω			
R14	80Ω	5		
R15	300Ω			
R16	470Ω			
R17	750Ω			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		EXCEL PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick							
L2	Osc. Coil							
L3	Input IF							
L4	Output IF							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	EXCEL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	8200Ω	12-14Ω								

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	EXCEL PART No.	QUAM PART No.	
SP1	2½"	PM	12-13Ω		25A07Z13	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	EXCEL PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.068A ①						① Selenium Type.

BATTERIES

ITEM No.	VOLTAGE	EXCEL PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M2	1.5V		2		950		M13M		
M3	67.5V			XX45		467		M200	

MISCELLANEOUS

ITEM No.	PART NAME	EXCEL PART No.	NOTES
M4	Tuning Cap.		2 Gang (Ant. 13-223mmf, Osc. 12-108mmf)
M5	Switch		Changeover
M6	Switch		Battery Charger

CABINETS & CABINET PARTS

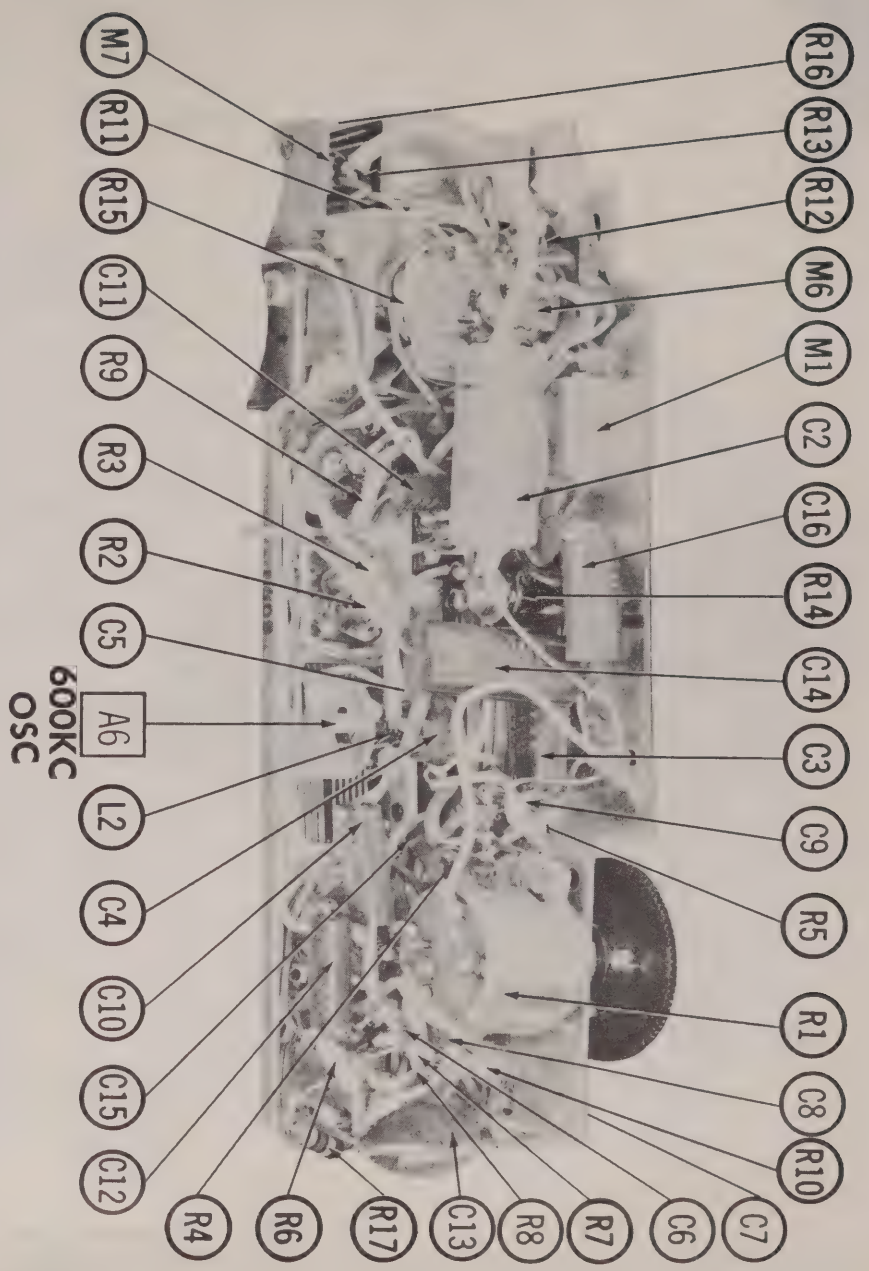
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

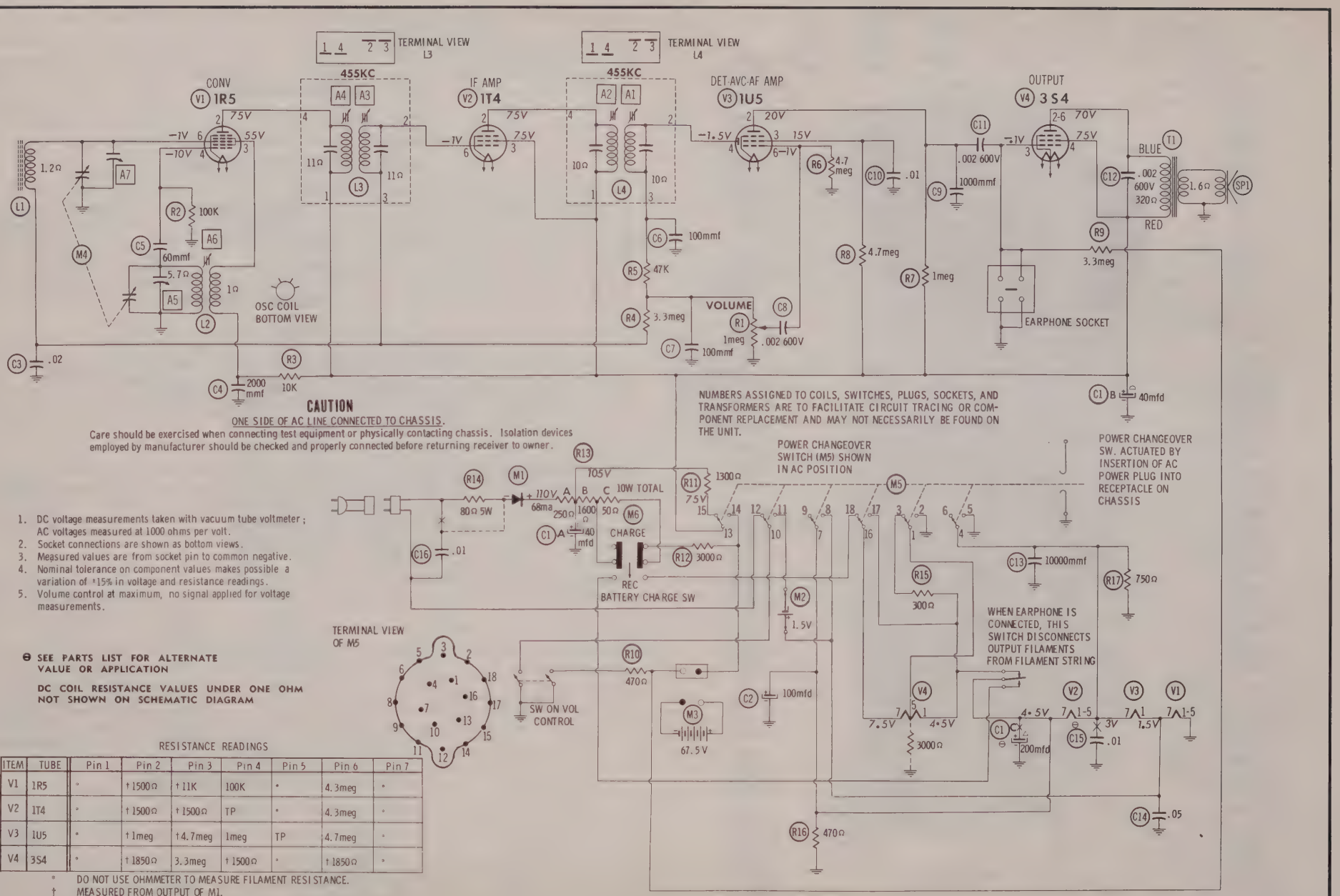
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS BOTTOM VIEW




TERMINAL VIEW L3
TERMINAL VIEW L4
455KC
455KC
CONV V1 1R5
IF AMP V2 1T4
DET-AVC-AF AMP V3 1U5
OUTPUT V4 3S4
OSC COIL BOTTOM VIEW
VOLUME
EARPHONE SOCKET
BLUE
RED
CAUTION
ONE SIDE OF AC LINE CONNECTED TO CHASSIS.
Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
POWER CHANGEOVER SWITCH (M5) SHOWN IN AC POSITION
POWER CHANGEOVER SW. ACTUATED BY INSERTION OF AC POWER PLUG INTO RECEPTACLE ON CHASSIS
REC BATTERY CHARGE SW
CHARGE
WHEN EARPHONE IS CONNECTED, THIS SWITCH DISCONNECTS OUTPUT FILAMENTS FROM FILAMENT STRING
SW ON VOL CONTROL
TERMINAL VIEW OF M5
67.5 V

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1R5	*	†1500Ω	†11K	100K	*	4.3meg	*
V2	1T4	*	†1500Ω	†1500Ω	TP	*	4.3meg	*
V3	1U5	*	†1meg	†4.7meg	1meg	TP	4.7meg	*
V4	3S4	*	†1850Ω	3.3meg	†1500Ω	*	†1850Ω	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM OUTPUT OF M1.
TP TIE POINT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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EXCEL MODEL XL-3

PHOTOFACT* Folder

KNIGHT
MODEL 4001

KNIGHT
MODEL 4001

GENERAL INFORMATION

Knight Model 4001 tape recorders feature push-button controls for each mode of operation.

Dual-track recording provides two full-length recordings on a reel of tape. Any size reel up to seven inches can be used. Two neon recording-level indicators simplify the recording-level setting.

The erase head is automatically positioned when the Record button is depressed. Thus, new recordings can be made on previously recorded tapes. Recordings can be made from a radio, television receiver, or phonograph, in addition to those made directly from a microphone.

The Model 4001 has two tape speeds, 7 1/2 and 3 3/4 ips. When both tracks of tape are used, the recording times are as follows:

Reel Size	3 3/4" Speed	7 1/2" Speed
5" (600 ft.)	1 Hour	1/2 Hour
7" (1200 ft.)	2 Hours	1 Hour

This recorder operates on 60 cycles, 117 volts AC only. Before connecting the recorder to a line supply, be absolutely certain the supply agrees with the foregoing specifications. The recorder will be severely damaged if connected to a direct current (DC) line.

Supplied by:
Allied Radio Corporation
100 North Western Avenue
Chicago 80, Illinois

This material compiled and published by

HOWARD W. SAMS & CO., INC., INDIANAPOLIS 6, INDIANA

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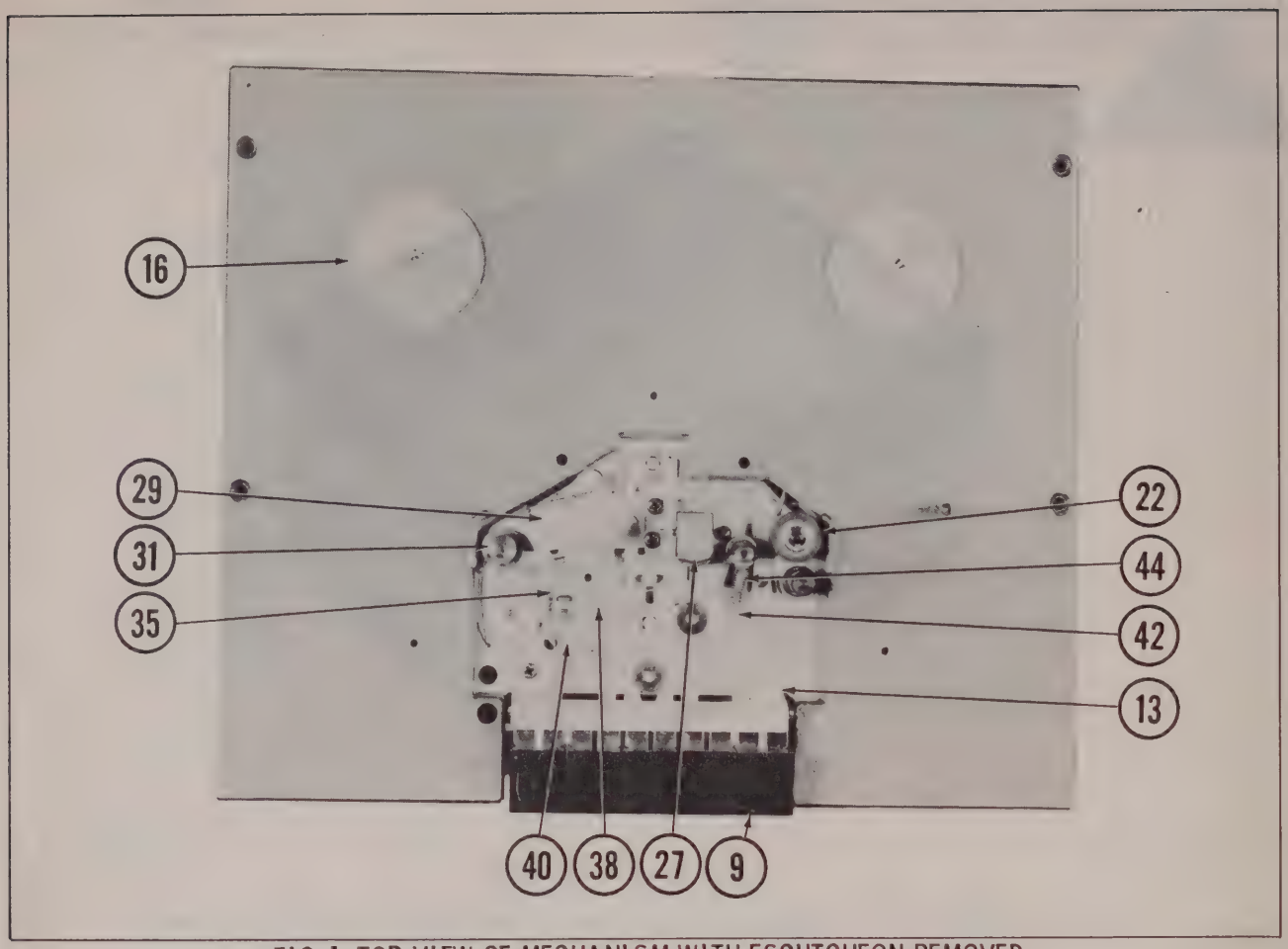


FIG. 1 TOP VIEW OF MECHANISM WITH ESCUTCHEON REMOVED

CHANGING TAPE SPEED FROM 7 1/2 TO 3 3/4 IPS

1. Remove record-lock knob.
2. Remove 8 screws from front plastic escutcheon and remove escutcheon.
3. Remove four screws holding tape deck to case.
4. Lift mechanism out of case.
5. Move rubber drive belt (65) to smaller part of motor drive pulley (73) and to corresponding groove on flywheel (64).
6. Reassemble the unit.

FUNCTION OF CONTROLS

High-Speed Forward or Rewind

To play a certain portion of tape over again, the entire reel need not be rewound. By depressing Forward or Rewind button, tape will advance or reverse rapidly.

Several minutes of normal recording can be skipped in a few seconds by using Forward and Rewind buttons.

Record

This control is used to record any sound being fed to tape from microphone, radio, television, or phonograph. Record button must be depressed while holding record lock to the left.

Play

This control is used to play back any sound on tape.

Stop

This control is used to stop the recorder from either Play, Record, Rewind, or Forward. It is a safety measure and must be depressed when tape recorder is not in use.

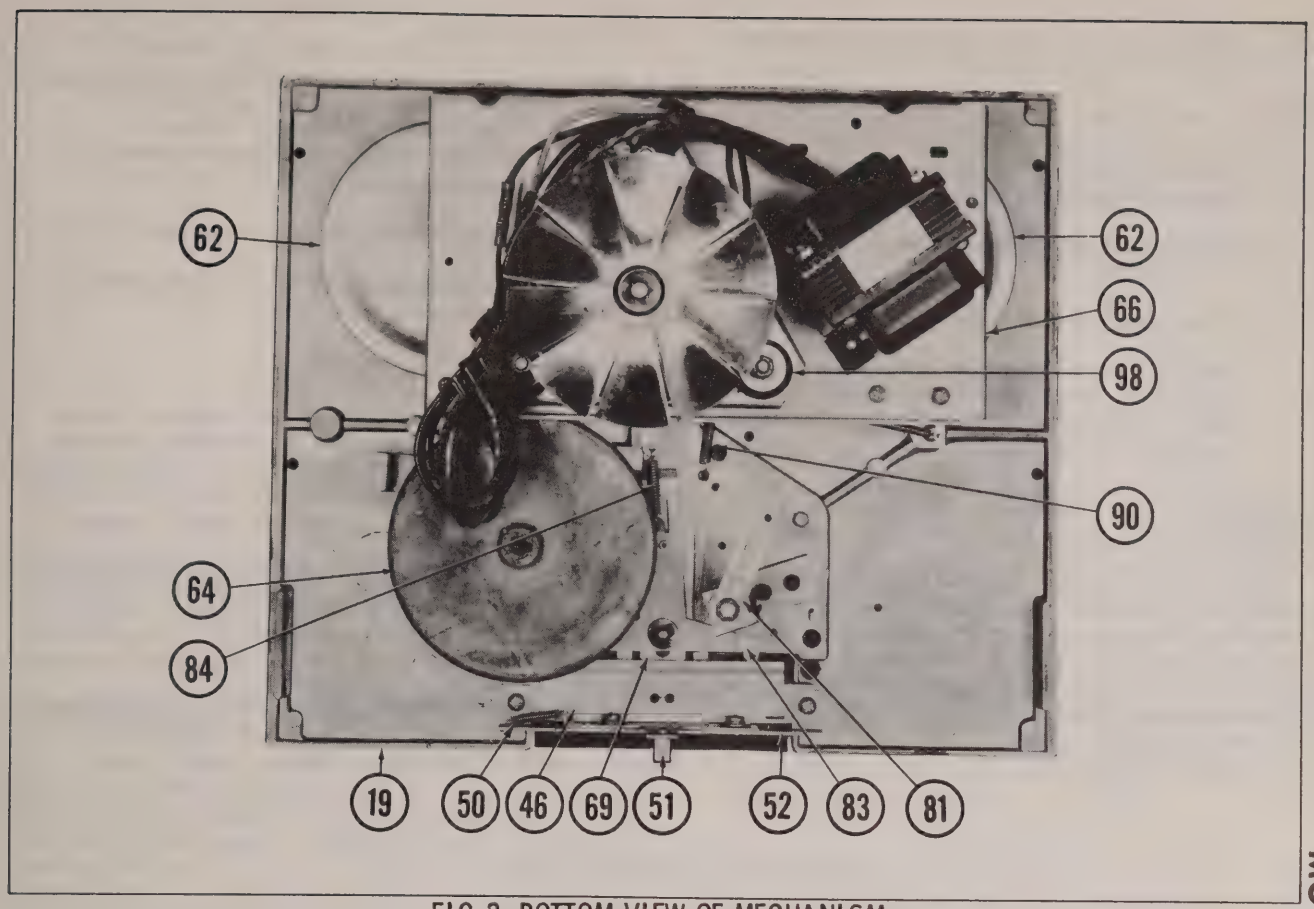


FIG. 2 BOTTOM VIEW OF MECHANISM

OPERATING INSTRUCTIONS

Threading Tape

1. Place a reel of tape on supply reel pan, making certain reel slots engage protrusions on pan. Place an empty reel on take-up reel pan, again making certain reel slots engage protrusions on pan.

2. Unwind about 14" of tape from supply reel. Hold a section of tape taut and insert into tape slot, making sure dull-coated side of tape faces away from operator.

3. Insert free end of tape into one of three slots in hub of take-up reel. While holding end of tape in place, give reel two or three turns to secure tape to reel.

To Record from Microphone

1. Turn On-Off switch to left and allow sufficient time for unit to warm up. Left neon light will glow when unit is on.

2. Move Record Lock knob to left, releasing the safety lock. This lock prevents accidental erasure.

3. Depress Record button while holding Record Lock knob to left until Record button latches.

4. Adjust Loudness control until right-hand neon indicator glows as brightly as left-hand indicator. If Loudness control is set too high, left-hand indicator will not light, causing distortion. For proper recording level, both neon indicators should glow.

5. Tone control is automatically disconnected while a recording is being made. When recording from a radio, set radio tone control for maximum treble.

6. Auxiliary switch on Tone control may be operated at any time during recording to monitor the recording. This allows tape recorder speaker to operate while a recording is being made. Keep microphone far enough from recorder to prevent acoustic feedback squeal.

To Record from Radio, Television Receiver, or Phonograph

1. Insert phonograph phono plug into Radio-PA-Phono input.

2. For radio or television recording, connect patch cord (part No. 96R674) to voice-coil terminals of radio or television receiver speaker with alligator clips. Plug into Radio-PA-Phono jack.

3. Proceed with recording as described under "To Record from Microphone."

NOTE: Remove patch cord from Radio-PA-Phono jack after recording is completed.

To Use Second Track

1. Depress Stop button after all of tape has been wound onto take-up reel.
2. Remove reel with tape and place on left-hand (supply) pan.
3. Place empty reel on right-hand (take-up) pan.
4. Thread tape and proceed with recording as described under "To Record from Microphone" or "To Record from Radio, Television Receiver, or Phonograph."

To Erase Tape

When Record button is depressed, erase head is automatically positioned, erasing any previous recording while a new one is being made. Material no longer needed may be erased, without recording, by depressing Record button and turning Loudness control to minimum volume. One track is erased at a time. To erase second track, reverse reels and repeat the foregoing prodedure.

To Play Recordings

1. Thread tape as described under "Threading Tape."
2. Set the mechanism to speed at which recording was made.
3. Depress Play button until it latches.
4. Adjust Loudness and Tone controls for desired listening level.

To Use as a Public Address System

To use recorder as a public address system, plug in an extension speaker or speakers, depress Record button, and set Volume and Tone controls to desired level. A recording can be made at the same time with tape placed on unit in normal manner.

CAUTION: Place microphone far enough from speaker or speakers to prevent acoustic feedback squeal.

Splicing Tape

Cut ends at a slight diagonal, butt ends together, and join them with a small piece of splicing tape on glossy side. Trim excess width.

DISASSEMBLY INSTRUCTIONS

To Remove Unit from Case

1. Remove four Phillips head screws from top plate.
2. Remove push-on type Record Lock knob.
3. Remove six Phillips wood screws from control escutcheon on front of case. Remove escutcheon.
4. Lift unit out of case, removing speaker plug from amplifier chassis before removing unit completely.

To Remove Amplifier from Transport Mechanism

1. Remove motor and power transformer plug from amplifier chassis.
2. Remove two head leads from play-record head.
3. Remove two slotted-head machine screws from each end of amplifier chassis.
4. Carefully lift amplifier away from transport mechanism and disconnect play-record switch actuating link.

MECHANICAL ADJUSTMENTS

Pressure Pad

1. Remove front escutcheon (8).
2. Depress Play button. Do not turn tape recorder on.
3. With a pencil-type postal scale, check the pressure needed to pull right-hand pad away from play-record head. Test should be made at end of pressure pad mounting spring. If necessary, adjust locked adjustment screw (39) until a reading of 1 3/4 oz. $\pm$ 1/4 oz. is obtained.
4. Guide post pressure pad (left-hand pad) is adjusted by bending pressure pad spring (38). The pad must be adjusted for minimum pressure against tape.

After adjustments are made, depress Stop button and replace front escutcheon.

Erase Head

1. With tape properly threaded, turn recorder on and depress Record button. Allow tape to run a few seconds; then turn recorder off, but leave Record button depressed.
2. With timer escutcheon (6) and front escutcheon (8) removed, check erase head (29) to see if it is parallel with tape.

3. Check to see if top edge of tape coincides with top end of diagonal slot in erase head (junction of long diagonal slot and short vertical slot). To adjust tape level, loosen set screw (30) and rotate left tape guide post (31) to move tape up or down.

Brake Shoe

1. Brake pads (107) should clear brake drums (62) by approximately 1/8" with all push buttons raised.

2. Depress Stop button while observing brake pads. Both brake pads must contact brake drums at same time and with equal pressure.

3. If necessary, adjust by bending brake spring

ELECTRICAL ADJUSTMENTS

Record Hum

Place unit in Record position, with volume at maximum and tone at full bass. Short out bias at L1. Connect a VTVM to External Speaker jack. Set VTVM to AC volts, 3-volt scale, with a 3.3-ohm load resistor across meter. Adjust record hum control R2A for minimum deflection on meter.

Head Alignment

Use standard 6-kc or 12-kc alignment tape. Remove front and rear escutcheons. Clean pole pieces of play-record head with a good commercial head cleaning agent, naptha, or lighter fluid. Then proceed as follows:

1. Thread alignment tape on recorder and turn volume on full, with tone at full treble. Connect VTVM to External Speaker jack. Set meter for AC volts, 3-volt range.

2. Place unit in Play position at 7 1/2" speed. Decrease volume until output is 1 volt on meter. Rotate play-record head adjustment screw (26) until maximum point of deflection is found.

3. Gently press pressure pad at point to extreme right of play-record head. Output should not increase. If a gain is noted, slightly readjust pressure pad (see "Pressure Pad" under "Mechanical Adjustments").

Indicator Light (Normal and Overload)

Normal and Overload indicator lights are preset, and there are no firing adjustments. If either light must be changed, both lights should be replaced with a matched set of neon indicators to insure proper recording level indication.

Bias

1. Set line voltage at 117 volts.

2. Place unit in Record position and turn Loudness control to maximum volume.

3. Connect VTVM between ground and pin 7 of V2. Place meter selector on AC volts, 10-volt range.

4. Adjust trimmer C9 for 2 volts on meter.

LUBRICATION

All rotating parts have factory-lubricated oilite bearings. With normal usage, no further lubrication is necessary. In heavy-duty service, the following parts should be lubricated once a year with a drop of #10 motor oil:

1. Top and bottom motor bearings.

2. Capstan bearing.

3. Pinch roller (22) bearing.

4. All idler and drive wheel bearings.

5. Reel spindle bearings.

Do not overlubricate. Keep oil off all rubber idlers, belts, and flywheel periphery, and any parts that might transfer oil to them. Always wipe excess lubricant from lubricated parts.

Ocassionally clean out the foreign matter under plastic push-button cover, and place a drop of oil on sliding lever.

CLEANING

Most defects, other than wear or breakage, can be traced to dirty surfaces. Play-record head (27), capstan, and pinch roller (22) may accumulate tape coating oxide, worn off tape as it passes these parts. This accumulation should be removed periodically since it will cause faint recording and poor playback. Wipe above surfaces carefully with a clean cloth. If dirt is caked or hard and cannot be removed with a dry cloth, dampen cloth slightly with alcohol.

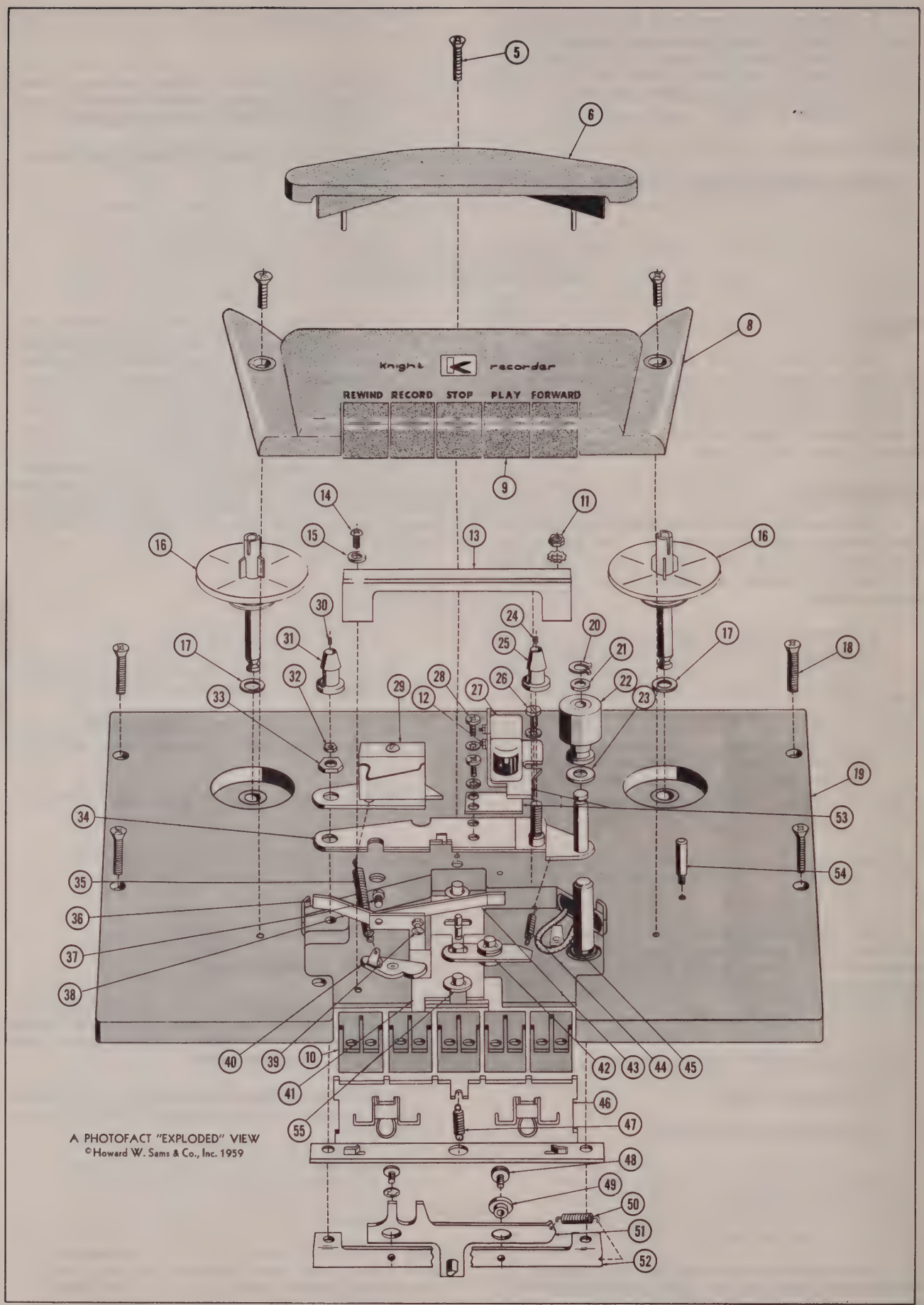


FIG. 3A EXPLODED VIEW OF PARTS ABOVE BASEPLATE

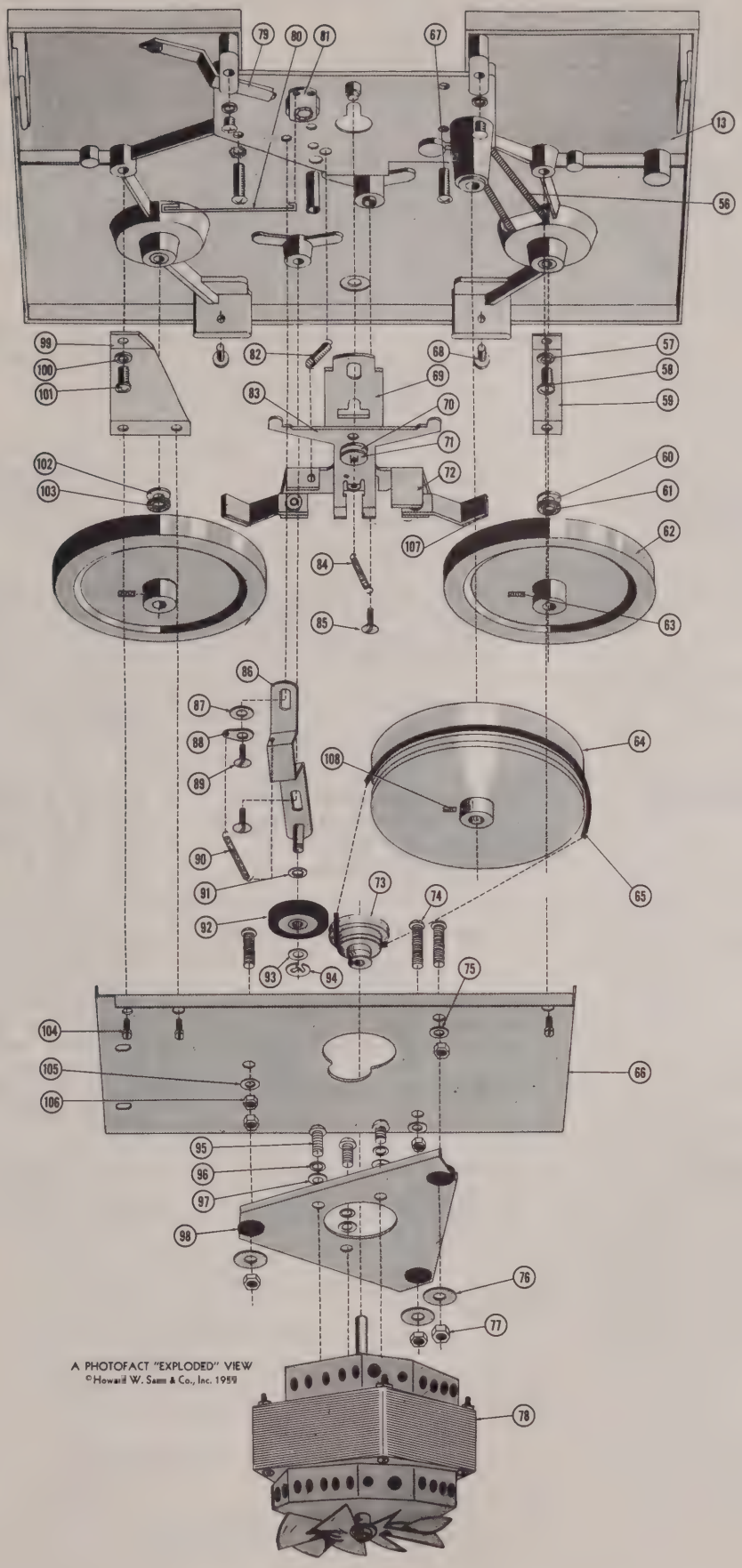


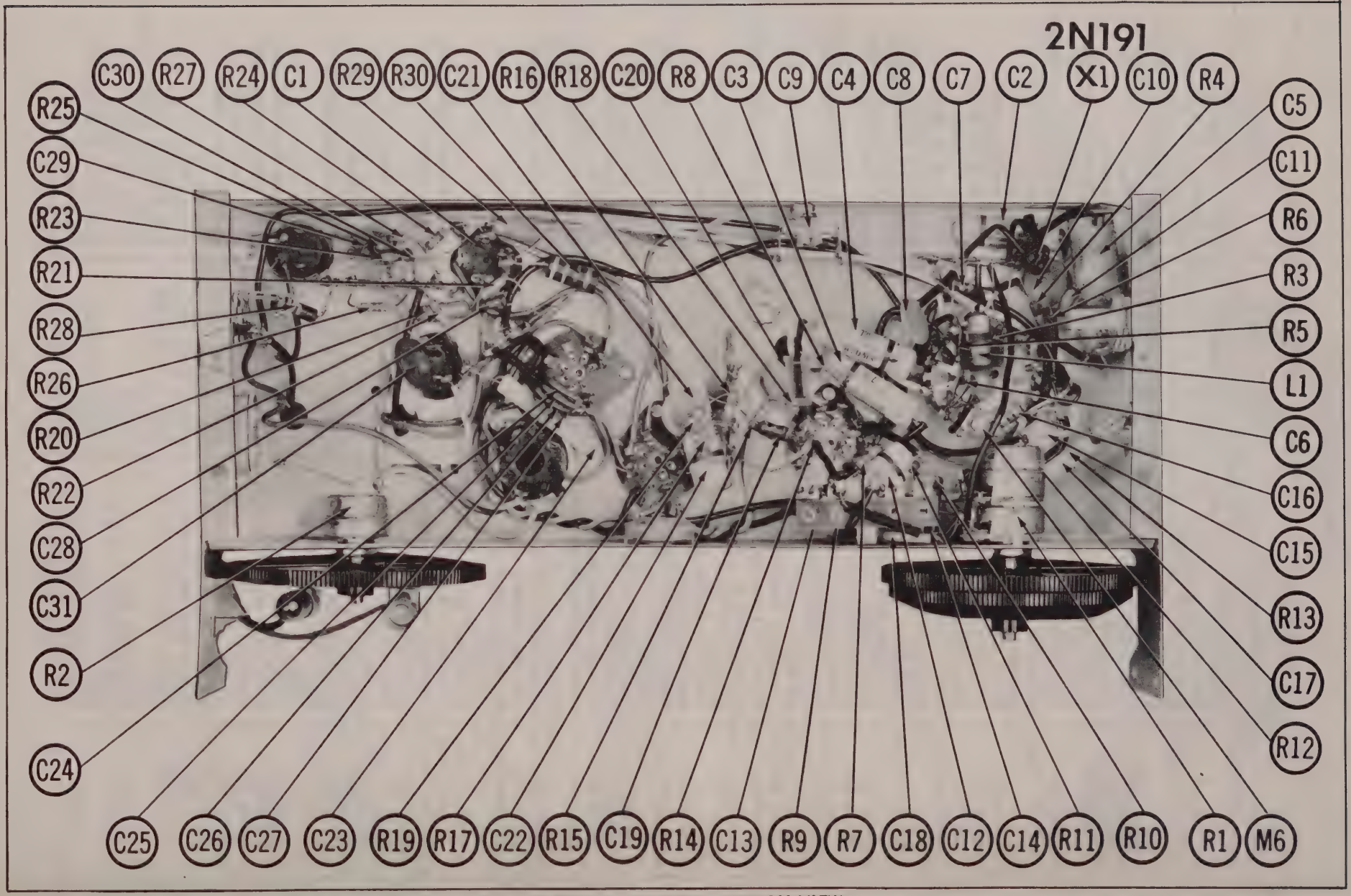
FIG. 3B EXPLODED VIEW OF PARTS BELOW BASEPLATE

TROUBLE CHART

Symptom	Cause	Remedy
Push buttons do not latch.	1. Lock plate spring (47) disconnected or broken.	1. Connect or replace lock plate spring (47).
Tape does not wind onto take-up reel during Play or Record.	1. Reel drive spring (45) loose, disconnected, or broken. 2. Nylon reel pan (16) shaft binding.	1. Connect or replace reel drive spring (45). 2. Remove foreign matter from bearing surface and shaft with a clean cloth. Lubricate with one drop of #10 motor oil.
No fast rewind.	1. Idler lever tension spring (90) disconnected or broken, thereby not actuating idler lever (86).	1. Connect or replace idler tension spring (90).
Tape spills when Stop button is depressed during fast forward or rewind.	1. Brake shoes out of alignment. 2. Brake pads (107) worn out or missing.	1. See "Brake Shoes" under "Mechanical Adjustments." 2. Replace brake pads (107).
Wow.	1. Brake return spring (82) disconnected or broken. 2. Oil or foreign matter on driving surfaces.	1. Connect or replace brake return spring (82). 2. Clean driving surfaces with a cloth and alcohol.
Flutter	1. Dirty play-record head (27), pressure pads, capstan shaft, or pinch roller (22).	1. Clean as described under "Cleaning."
No erase, or incomplete erase.	1. Erase head tension spring (35) disconnected or broken. 2. Erase head (29) not properly adjusted.	1. Connect or replace erase head tension spring (35). 2. See "Erase Head" under "Mechanical Adjustment."
Does not record.	1. Faulty microphone or cord. 2. Faulty input jack. 3. Faulty tube. 4. Low bias voltage. 5. Open play-record head (27).	1. Replace, if necessary, after checking recorder with another type of input. 2. Replace input jack, if necessary. 3. Replace any defective tubes. 4. See "Bias" under "Electrical Adjustments." 5. Check continuity. After checking continuity, demagnetize head.
Motor and amplifier do not operate.	1. Defective power supply. 2. Damaged power cord. 3. Defective On-Off switch.	1. Check voltages per schematic. 2. Repair or replace power cord. 3. Replace On-Off switch.

Ref. No.	Part No.	Description
5		Head Cover Screw
6		Head Cover
7	57-4C-610-5	#6-32 x 5/8 O.H.M.S. Phillips
8		Front Escutcheon
9	B-13.306-1	Push Button (Gray)
10	B-19.876-1	Push Button Lever
11	48-2219-1	#6-32 x 5/16 Keps Hex Nut
12		#2-56 x 3/16 Hex Nut
13	B-19.858	Push Button Retaining Brkt.
14	57-4C-610-5	#6-32 x 5/8 O.H.M.S. Phillips
15	73-2231-4	#6 Int. Lockwasher
16	C-13.318-0	Nylon Reel Pan & Shaft Assy.
17	B-28.163	Linen Washer
18	57-4C-816-5	#8-32 x 1 O.H.M.S., Phillips
19		Base Plate
20		"E" Ring, 3/16" Shaft
21	B-28.163	Linen Washer
22	B-33.404	Pinch Roller
23	B-28.163	Linen Washer
24	57-3439	#6-32 x 3/16 Bristol Hd. Set Screw
25	B-32.282	Tape Guide Post(Right)
26	57-3102-1	#4-36 x 1/4 R.H.M.S. (Azimuth Adj.)
27	B-36.212	Play-Record Head
28		Head Mtg. Screw
29	B-35.1048	Erase Head Ass'y.
30	57-3439	#6-32 x 3/16 Bristol Hd. Set Screw
31	B-32.300	Tape Guide Post (Left)
32	48-410-1	#6-32 Hex Nut
33	B-32.260	Tape Guide Post Spacer
34	C-35.1067	Pinch Roller & Record Head Ass'y.
35	B-31.361	Erase Head Tension Spring
36	B-31.334	Felt Pad (2 used)
37	57-1C-603-2	#6-32 x 3/16 B.H.M.S., Phillips
38	B-35.1047-1	Pressure Pad Ass'y.
39	57-16C-606-1	#6-32 x 3/8 R.H.M.S.
40	B-35.1025-1	Record Actuating Lever Ass'y.
41	B-19-868	Record Slide Plate
42	B-19.881	Playback Actuating Lever
43	B-35.1047-1	Pressure Pad Spring Ass'y.
44	B-31.360	Pinch Roller Tension Spring
45	B-31.351	Reel Drive Spring (Belt)
46	B-19.859-1	Hinge Bracket for Push Button
47	B-31.343	Lock Plate Spring
48	57-3576-1	#8-32 x 1/4 Sems. P.H.M.S.
49	B-32.291	Shouldered Washer
50	B-31.427	Record Lock Return Spring
51	B-35.1023	Record Lock Ass'y.
52	B-19.1364-1	Record Lock Mtg. Plate
53	B-35.1063	Play-Record Head Bracket Ass'y.
54	B-32.373	Tape Guide Post
55	B-33.412	Push-On Stud Nut, 3/16" Stud
56	B-31.351	Reel Drive Spring (Belt)

Ref. No.	Part No.	Description
57	73-2231-5	#8 Int. Lockwasher
58		#8 Screw, R.H.M.S., Phillips
59	B-19.862C	Angle Bracket For Mounting Drive Ass'y.
60	B-28.163	Linen Washer
61	73-2241-134	Flat Washer
62	C-35.823-1E	Brake Drum and Bushing Ass'y. (2 Used)
63		#8-32 B.H.M. Screw (2Used)
64		Flywheel
65		Drive Belt
66		Drive Mounting Plate
67		#8-32 R.H.M. Screw Phillips (2 Used)
68		#8-32 R.H.M. Screw, Phillips (2 Used)
69	C-35.835	Brake Slide Plate Ass'y.
70	B-28.163	Linen Washer
71	B-33.412	Push-On-Stud Nut, 3/16" Stud
72	B-35.764	Pressure Pad Spring Ass'y.
73		Drive Pulley
74		Motor Adapter Plate Screw (3 Used)
75		Motor Adapter Plate Washer (3 Used)
76		Flat Washer (3 Used)
77		Hex Nut (3 Used)
78		Motor
79	B-35.774	Record Interlock Ass'y.
80	B-31.333	Switch Arm Link
81	B-35.859-1	Switch Lever Ass'y.
82	B-31.338-B	Brake Return Spring
83	B-35.759-1	Shift Plate Ass'y.
84		Shift Plate Tension Spring
85		Screw
86		Fast Forward Idler Wheel Bracket
87		Washer
88		Washer
89		Screw
90		Fast Reverse Idler Wheel Tension Spring
91		Washer
92		Idler Wheel
93		Washer
94		"C" Washer
95		Motor Mounting Screw
96		Washer
97		Washer
98		Grommet, Motor Mounting
99	B-19.863	Drive Mounting Plate Brkt.
100	72-2231-5	#8 Int. Lockwasher
101		#8-32 R.H.M. Screw, Phillips
102	B-28.163	Linen Washer
103	73-2241-143	Flat Washer, Steel
104		Screw, Drive Mounting Plate
105		Washer (3 Used)
106		Hex Nut (4 Used)
107	B-31.335A	Brake Pad, Felt (2 Used)
108		Set Screw



ELECTRICAL CHASSIS - BOTTOM VIEW

ELECT. PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp.	12AX7/ ECC83	
V2	Output	6AQ5	
V3	Rectifier	6X4	

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N191	Playback Pre Amp. -Bias Osc.					PNP Note 1

Note 1. Early versions may use 2N133 or GT20.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▲20	450	C-5.421-7	AFH4-67	D0520	FP444	TMQ-83	TVL-4724.2	
B	▲20	450							
C	■20	450							
D	20	25							
C2	50	6	B-5.448 ①	SRE6V50	BBR50-6	TT6X50	TD-50-6	TVA-1100	
C3	50	6	B-5.448	SRE6V50	BBR50-6	TT6X50	TD-50-6	TVA-1100	
C4	50	6	B-5.448	SRE6V50	BBR50-6	TT6X50	TD-50-6	TVA-1100	

① Not used in some versions.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	KNIGHT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	.5	100	D-3.100-33	P288N-5		CUB2P5	GEM-205	2TM-P5	①
C6	470		C-4.151-2	1469-00047	MD-471	5RST47		MS-347	10%
C7	2000		C-4.109-42						10%
C8	10000		C-4.115-19	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C9	10-160		B-4.152						
C10	10000		C-4.115-19	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C11	470		C-4.109-41	SI 470	D6-471	LT6T47	UC-5347	5GA-T47	
C12	.047	400	4.148-58	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C13	50		C-4.151-1	1469-00005	DD-500	5R5Q5	MCE225	MS-45	10%
C14	1500		C-4.109-13						10%
C15	.033	400	D-4.148-56	P488N-033		CUB4S33	GEM-4133	4TM-S33	②
C16	100		C-4.109-40	SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C17	470		C-4.109-41	SI 470	D6-471	LT6T47	UC-5347	5GA-T47	
C18	20000		C-4.115-23	BPD-02	DD-203	BYB6S2		5HK-S2	
C19	100		C-4.109-40	SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C20	10000		C-4.115-19	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C21	10000		C-4.115-19	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C22	.047	400	4.148-58	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C23	1500		C-4.109-13						10%
C24	5000			BPD-005	DD-502	BYA10D5	DC525	5HK-D5	③
C25	5000			BPD-005	DD-502	BYA10D5	DC525	5HK-D5	③
C26	5000			BPD-005	DD-502	BYA10D5	DC525	5HK-D5	③
C27	5000			BPD-005	DD-502	BYA10D5	DC525	5HK-D5	③
C28	330		C-4.109-39		D6-331				10%
C29	10000		C-4.115-19	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C30	100		C-4.109-40	SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C31A	4000		B-4.131-2	BPD-2X004	DD-402	BYC6DD4	DCD524	5HK-2D4	
B	4000				DD-402				

① Not used in some versions.
② Some versions may use .02mfd 400V in this application. (Part #D-4.115-24)
③ Some versions may use a single 20000mmf to replace C24, C25, C26, & C27 (Part #C-4.115-23).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	KNIGHT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	1/2	B-11.252	F1-52			■ UE3835S	Loudness
B	250K	1/2		R2-35				Tone
C	Switch			KR-1				
R2A	500Ω	1/2	B-8.240	AB-4	B47-500-S	B11-103	PTA52L	Hum Adjust
B	Shaft			AK-1	Not Req.	SK2	Not Req.	

■ "STA-LOC" Equivalent: FB16A, OF812, RU254A, IS1250, US41.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		KNIGHT PART No.	NOTES
	OHMS	WATT		
R3	100K		D-7.101-100	Note 1
R4	10K		D-7.101-58	
R5	5600Ω		D-7.101-48	Note 2
R6	1000Ω		D-7.101-16	Note 1
R7	4.7meg		D-7.101-178	
R8	220K		D-7.101-114	
R9	100K		D-7.101-100	
R10	100K		D-7.101-100	
R11	10K		D-7.101-58	
R12	1meg		D-7.101-141	
R13	390K		D-7.101-125	
R14	47K		D-7.101-86	
R15	1meg		D-7.101-141	
R16	220K		D-7.101-114	

ITEM No.	RATING		KNIGHT PART No.	NOTES
	OHMS	WATT		
R17	68K		D-7.101-93	
R18	2200Ω		D-7.101-30	
R19	470K		D-7.101-128	
R20	330Ω	1	D-7.102-2	
R21	220K		D-7.101-114	
R22	150K		D-7.101-107	
R23	10meg		D-7.101-191	
R24	4.7meg		D-7.101-178	
R25	10meg		D-7.101-191	
R26	1.5meg		D-7.101-148	
R27	1meg		D-7.101-141	
R28	3.3Ω		D-6.212-1	
R29	4700Ω	1	D-7.102-51	
R30	470Ω	1	D-7.102-9	

Note 1. Not used on some versions.
Note 2. Some versions may use 10K in this application (Part #D-7.101-58).

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		KNIGHT PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Bias Osc.	B-1.557					

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .8A	420VCT @ .032A	6.3V @ 1.2A	D-9.263-2	24R11U	P-3147		PC8418	24R11U	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5200Ω	3-4Ω	C-9.264	26S49	A-3019	AU-606	A-8092	26S49	S-5X	

SPEAKER

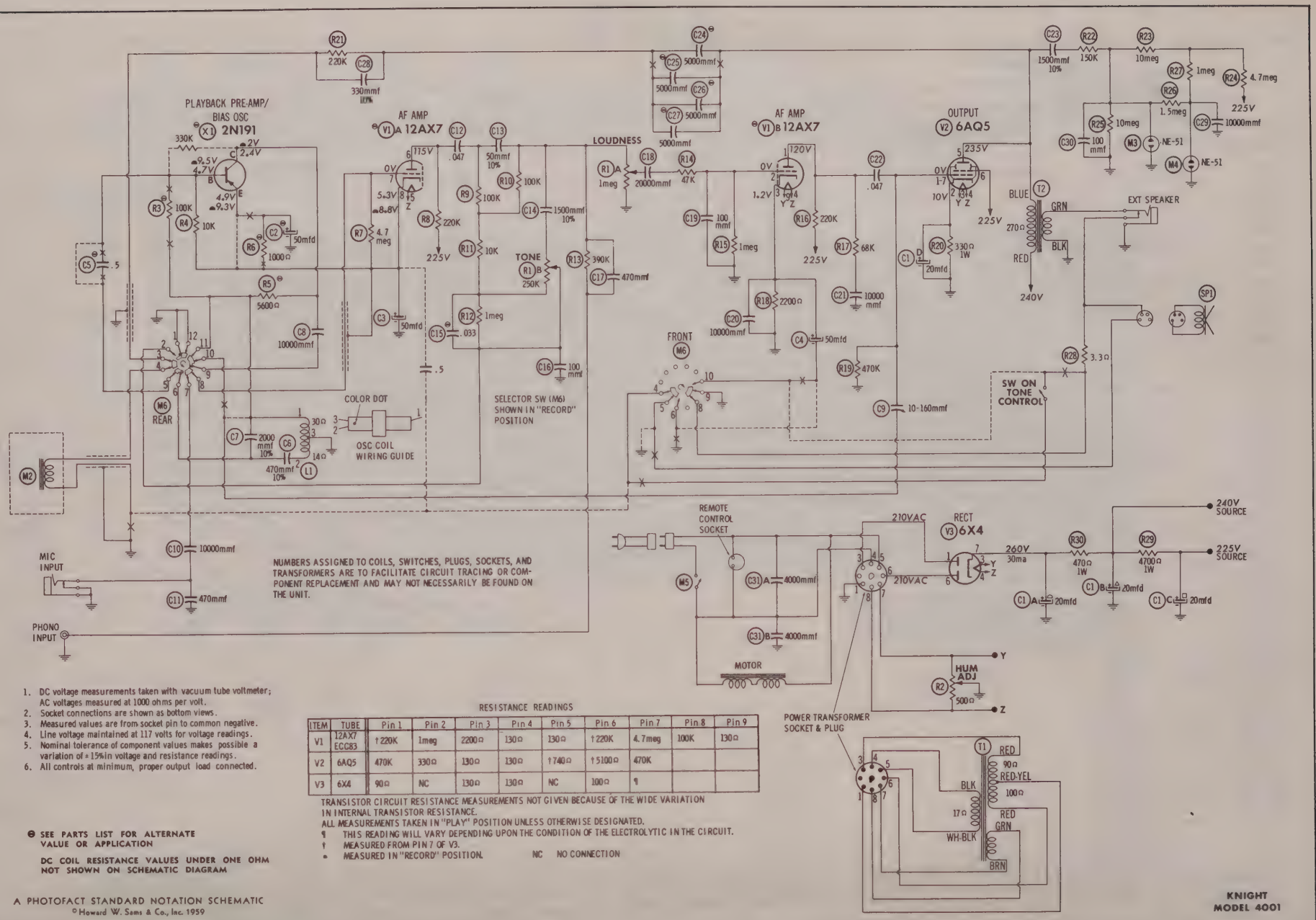
ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	KNIGHT PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω			

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M1	Erase Head	B-35.1048	Assembly, includes permanent magnet head #C-35.756-1
M2	Record-Playback Head	B-36.212	
M3	Lamp	45-2036-1	NE51
M4	Lamp	45-2036-1	NE51
M5	Switch	B-11.250	Power, On-Off
M6	Switch	B-11.254B	Function (Rotary Wafer Type)
	Microphone	36.211	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7 ECC83	†220K	1meg	2200Ω	130Ω	130Ω	†220K	4.7meg	100K	130Ω
V2	6AQ5	470K	330Ω	130Ω	130Ω	†740Ω	†5100Ω	470K		
V3	6X4	90Ω	NC	130Ω	130Ω	NC	100Ω	¶		

TRANSISTOR CIRCUIT RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
ALL MEASUREMENTS TAKEN IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V3.
• MEASURED IN "RECORD" POSITION. NC NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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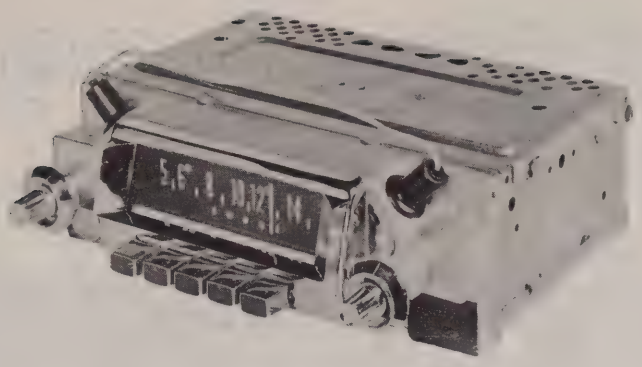
KNIGHT MODEL 4001

PHOTOFACT* Folder with CIRCUITRACE*
EIA ELECTRONIC INDUSTRIES ASSOCIATION MEMBER

MOPAR MODELS 856, 857

MOPAR MODELS 856, 857



TRADE NAME	Mopar Models 856 (For 1959 MD1, MD2, MD3 Dodge Automobiles), 857 (For 1959 MS1, MS2, MS3 DeSoto Autos)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	Battery Operated 4 Tube Custom Built AM Automibile Receiver With Transistorized Output.
POWER SUPPLY	12 Volt Storage Battery — RATING 1.6 Amp. @12.6 Volts DC
TUNING RANGE—BROADCAST	540 - 1610KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:

A1 thru A4..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

A5, A6..... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525

A8, A9, A10, A11..... GENERAL CEMENT #9050L, 9150
WALSCO #2521

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to antenna receptacle. Low side to chassis.	262.5KC (400~ Mod.)	High Freq. end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	Fig. 1.	Thru dummy to antenna receptacle.	1610KC	"	"	A5, A6	"
3.	"	"	1400KC	1400KC Signal	"	A7	"
	Steps 4 & 5 not necessary unless tuner has been tampered with or associated components have been replaced. Back tuning cores (A8, A9 and A10) 1 3/8" out of coils.						
4.	Fig. 1.	Thru dummy to antenna receptacle.	1610KC	High Freq. end stop.	Across voice coil	A5, A6, A7	Adjust for maximum output.
5.	"	"	1020KC	Tuner carriage 49/64th" in from high end stop.	"	A8, A9, A10	Adjust for maximum output. Repeat Steps 4 & 5.
6.	"	"	1925KC	1400KC	"	A11	Adjust for MINIMUM output.

With radio installed in car and antenna fully extended, tune in a weak station near 1400KC and adjust A7 for maximum output.

With radio tuned to a 1000KC signal, adjust pointer adjustment so that pointer coincides with 1000KC mark on dial.

PUSHBUTTON ADJUSTMENT

1. Pull pushbutton out.
2. Tune manually to desired station.
3. Press button in firmly.
4. Repeat for remaining pushbuttons.

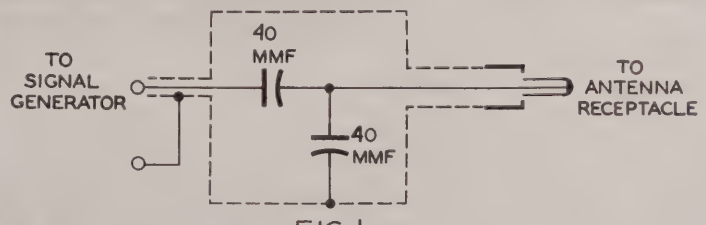


FIG. 1

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JD233

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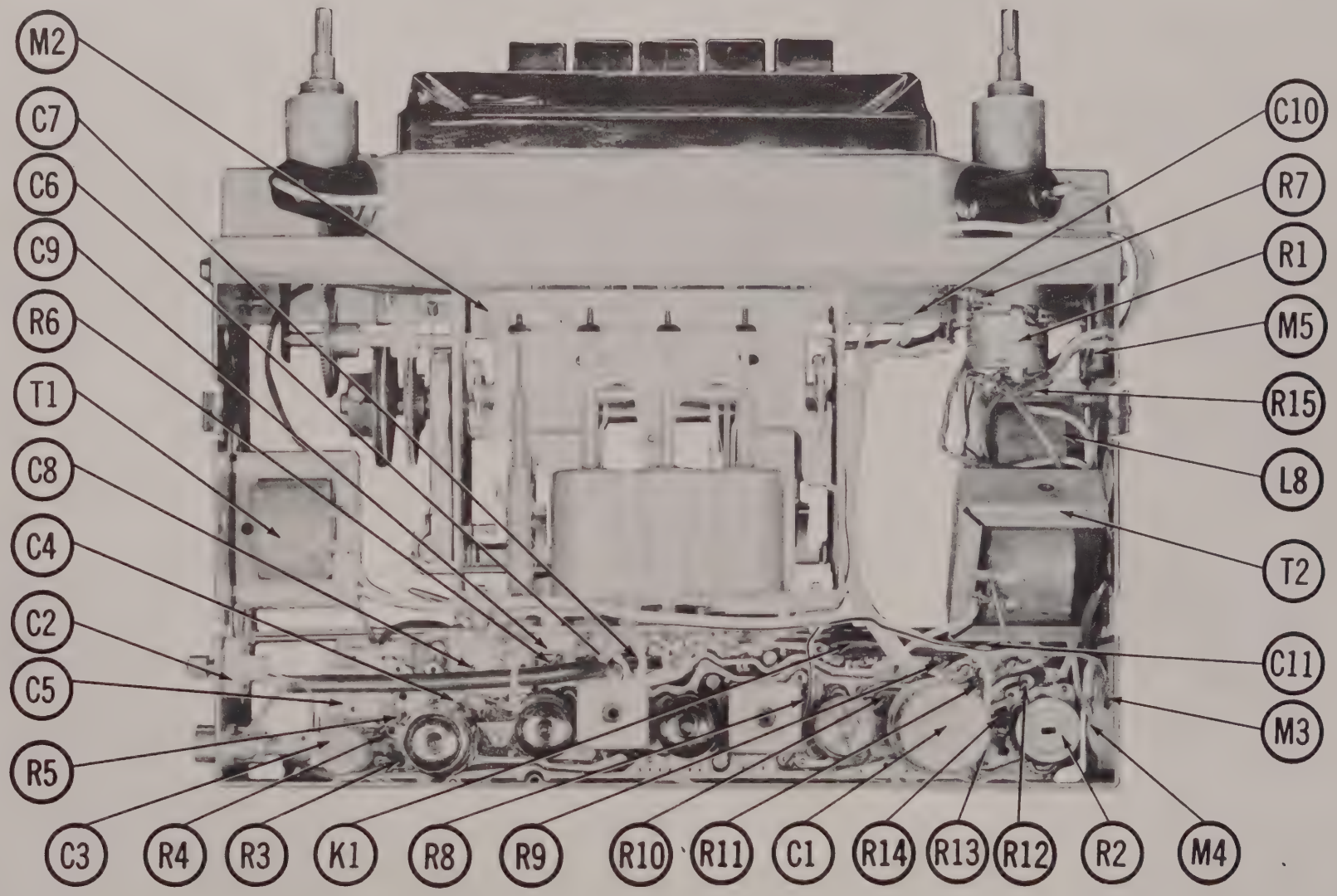
SET 454 FOLDER 10



CHASSIS TOP VIEW - RESISTOR, CAPACITOR, & MISC IDENT.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12EG6	
V2	Converter	12AD6	
V3	IF Amplifier	12BL6	
V4	Det.-AVC-AF Amp.	12AE6A	

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N573	Driver			2N573		PNP
X2	2N176	Output	2N155	2N176		2N176	PNP Note 1

Note 1. When replacing, apply DC-4 grease (Part #11M490487), or equivalent, to both side of the insulator and tighten mounting screws securely.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	■700	16	23K561580	AFH2-02-60		PWP200.4		PCLS-2179*	
B	▲300	16							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	18-115			20K542026						
C3	.1	100		8K124891	P2151N-1	DF-104	BC2P1J	ACE401	2SE-P10	
C4	3.3			21R115951	NPO-SI 3.3	TCZ-3R3	C10V33C	ZT-5533	5TCCB-V33	
C5	50-260			20K561324						
C6	47		N750	21K561564	N750-DI 47	DTN-47	C10Q47U	CN7-447	5TCU-Q47	
C7	100		N220 5%							①
C8	130-210			20B561323						
C9	.1	200		8R121573	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C10	5000				BPD-005	DD-502	BYA10D5	B-250	5HK-D5	②
C11	3300			21R120422	BPD-0033	DD-332	BYA10D33	B-233	5HK-D33	

① Some versions may use 100mmf N470 5% in this application (Part #21R129366). When replacing, unit should be wired to printed board if not previously done so.
② Some versions may use 3000mmf in this application (Part #21B129377).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	4meg	1/2	18B561732①	F1-82	RTV661C		UE-3831-S	Tone
B	1.3meg	1/2		R2-60				Volume, Tap@600K
C	Switch			KR-7				Power On-Off
R2	15Ω	1 (ww)	18K561139				PFL-15	Bias

① Part #18K561733 used in Model 857.

RESISTORS

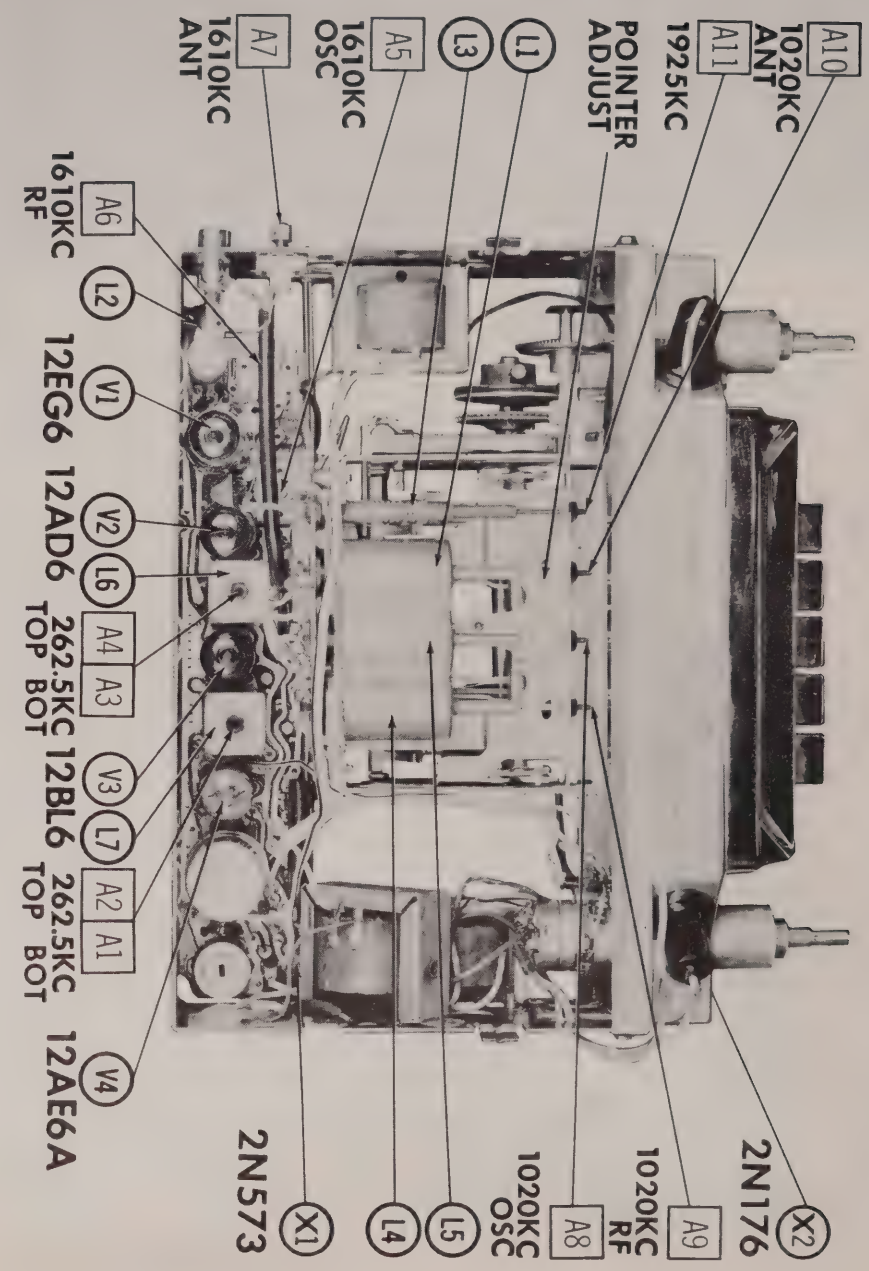
All wattages 1/2 watt, or less, unless otherwise listed.

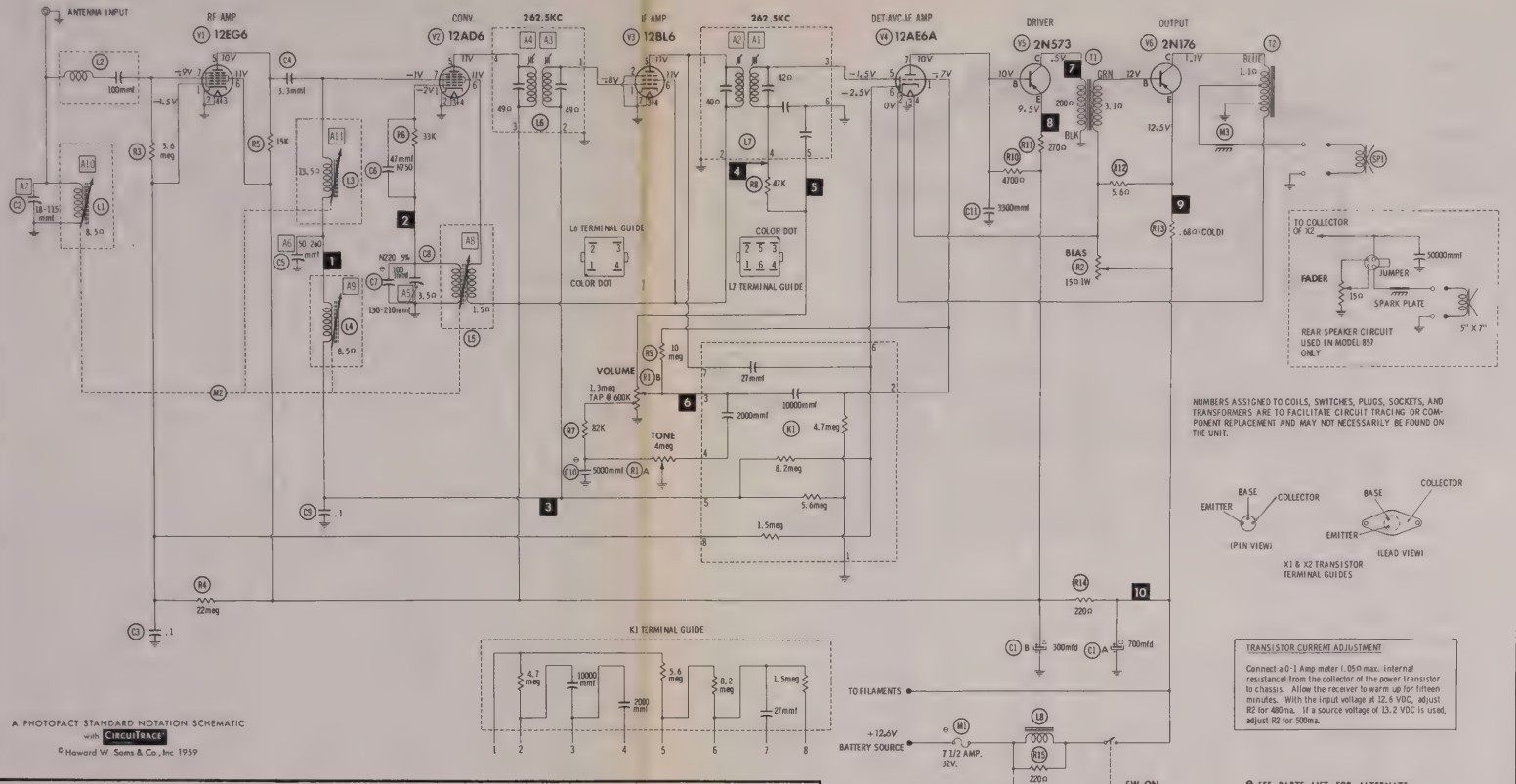
ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R3	5.6meg		6K124761	
R4	22meg		6R488158	
R5	15K		6R2119	
R6	33K		6K121704	
R7	82K			Note 1
R8	47K		6K121687	
R9	10meg		6K119408	

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R10	4700Ω		6R6039	
R11	270Ω		6K121303	
R12	5.6Ω		17K739323	
R13	.68Ω Cold		17A561516	
R14	220Ω		6K125471	
R15	220Ω		6K125471	

Note 1. Some versions may use 180K in this application (Part #6K125531).

CHASSIS—TOP VIEW





NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

X1 & X2 TRANSISTOR TERMINAL GUIDES

TRANSISTOR CURRENT ADJUSTMENT

Connect a 0-1 Amp meter (.05Ω max. internal resistance) from the collector of the power transistor to chassis. Allow the receiver to warm up for fifteen minutes. With the input voltage at 12.6 VDC, adjust R2 for 480ma. If a source voltage of 13.2 VDC is used, adjust R2 for 500ma.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

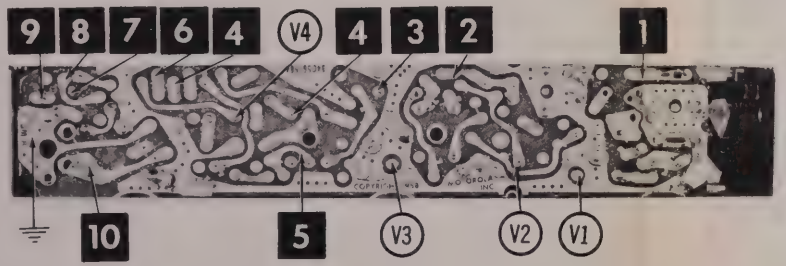
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12EG6	10meg	0Ω	3Ω	0Ω	†15K	†220Ω	16meg
V2	12AD6	33K	0Ω	0Ω	3Ω	†270Ω	†220Ω	5.6meg
V3	12BL6	5.6meg	0Ω	0Ω	3Ω	†260Ω	†220Ω	0Ω
V4	12AE6A	4.7meg	.1Ω	0Ω	3Ω	1.3meg	10meg	¶5000Ω

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
† MEASURED FROM POSITIVE TERMINAL OF C1A AND R14.
¶ X1 REMOVED FOR MEASUREMENT.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views
3. Measured values are from socket pin to common negative
4. Battery voltage maintained at 12.6 volts for voltage readings
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements



A Howard W. Sams CIRCUITRACE Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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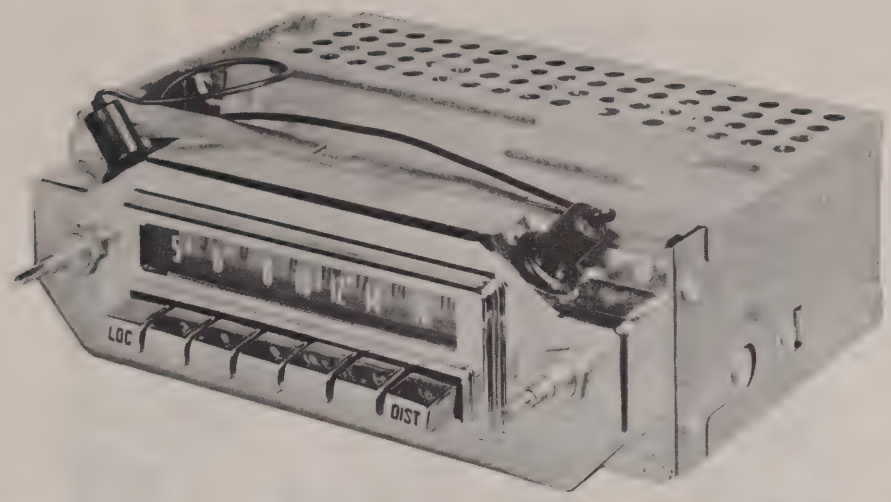
MOPAR
MODELS 856, 857

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

MOPAR MODEL 928

MOPAR MODEL 928



TRADE NAME	Mopar Model 928 (R95BC-S) For 1959 Chrysler Automobiles
MANUFACTURER	Bendix Radio Div., Bendix Aviation Corp., Baltimore 4, Maryland
TYPE SET	Battery Operated Custom Built 5 Tube AM Automobile Receiver With Transistorized Output
POWER SUPPLY	12 Volts DC
RATING	1.4 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	530 - 1605KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1, A2, A3, A4 ..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A5, A6 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A8, A9, A10 ..... GENERAL CEMENT #9050L, 9150
WALSCO #2521

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of Converter. Low side to chassis.	262.5KC (400% Mod.)	High frequency end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	Fig. 1	Thru dummy to antenna receptacle.	1605KC	"	"	A5, A6, A7	"
	Step 3 is not necessary unless tuning cores or coils have been replaced or tampered with. If necessary, back A8, A9 and A10 out of coils. Repeat step 2.						
3.	Fig. 1	Thru dummy to antenna receptacle	1000KC	½" carriage movement from high frequency end stop.	Across voice coil	A8, A9, A10	Adjust for maximum output. Repeat steps 2 and 3 until no further improvement is noted.
	With radio installed in car and antenna fully extended, tune in a weak station near 1600KC and adjust A7 for maximum output.						

PUSHBUTTON ADJUSTMENT

1. Tune manually to desired station.
2. Pull button out; press in firmly.
3. Repeat for remaining buttons.

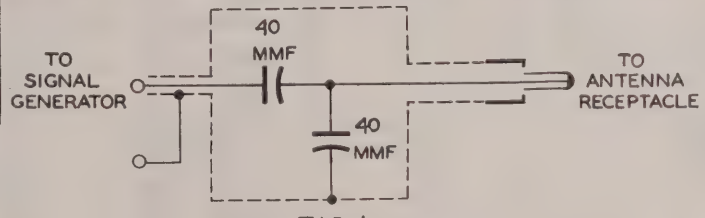


FIG. 1

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JD224

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SET 454 FOLDER 11

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BL6	
V2	Converter	12AD6	
V3	IF Amplifier	12EK6	

ITEM No.	USE	TYPE	NOTES
V4	Det. - AVC - AF Amp.	12FK6	12FM6 *
V5	Trigger-Relay Control	12DY8	

* Alternate

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N1009	Driver			2N1009		PNP
X2	2N1033	Output					PNP Note 1
X3	2N1033	Output					PNP Note 1

Note 1. When replacing, apply silicon grease to both sides of the insulator.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	BENDIX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	500	16	220353-13	AFH3-00-94				PCLS-3026.6*	
B	■250	16							
C	▲250	16							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

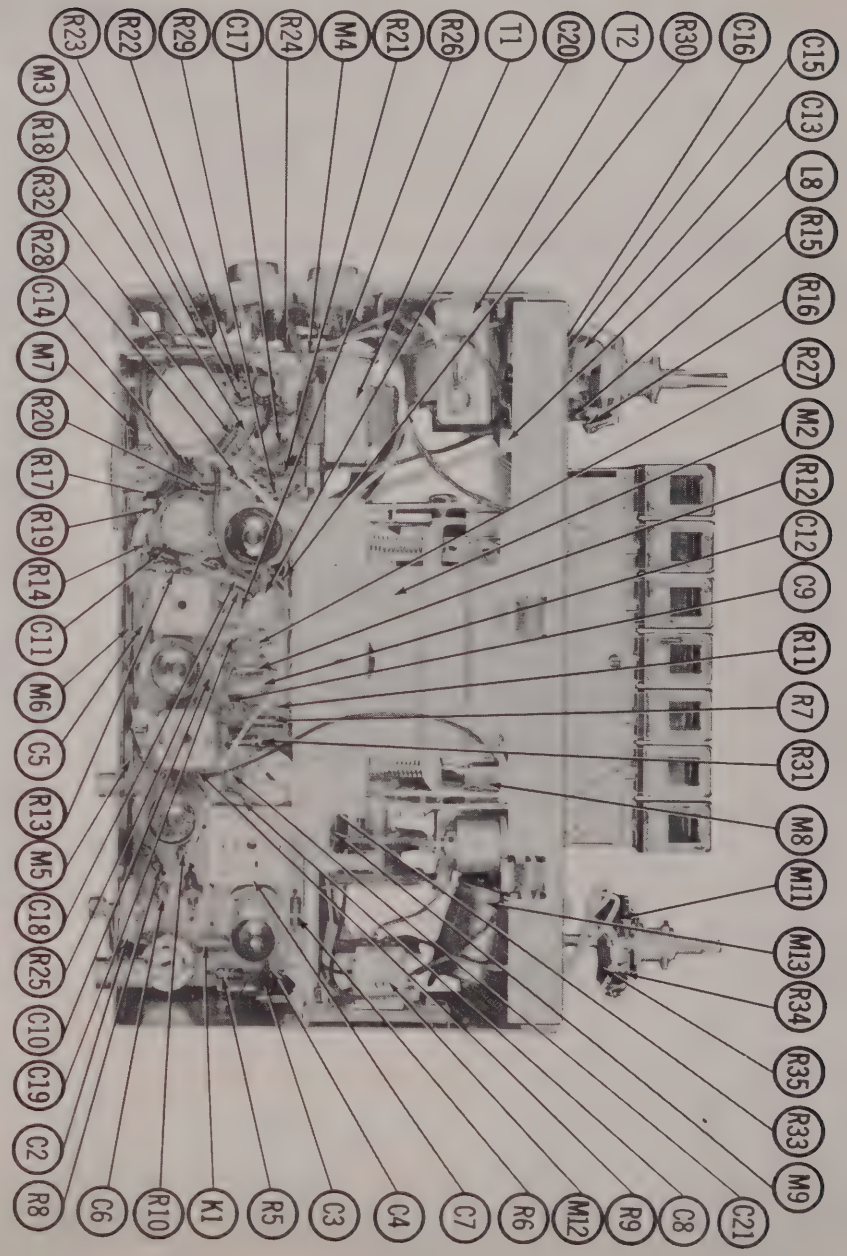
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	BENDIX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	4-75			219083-1						
C3	110		5%	220348-406	1469-00011	TCZ-110	22R5Q12		5GA-T11S 5% *	
C4	22		NPO	220332-30	NPO-DI 22	DTZ-22	C10Q22C	CNO-422	5TCC-Q22	
C5	.01	100		2090207-9	P288N-01	DM-103	CUB4S1	GEM-411	4TM-S1	
C6	47			220332-52	BPD-000047	DD-470	L10Q47	UC-5447	5GA-Q47	
C7A	60-230			219092-3						
B	370-445									
C	80									
C8	51		N750 10%	220332-16	N750-SI 51	TCN-51			5TCU-Q51S 10% *	
C9	1000			220332-36	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C10	.82		5%	220212-16						
C11	47		10%	2090926-1	1469-000047	DD-470	22R5Q47	CNO-447	5GA-Q47S 10% *	
C12	50000	100		220332-40	BPD-05	DF-503		BT-150	5HK-S5	
C13	3300			2090058U-332M	BPD-0033	DD-332	BYA10D33	B-233	5HK-D33	
C14	5000			2090058S-502M	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C15	5000			2090058S-502M	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C16	1200			2090058U-122M	BPD-0012	DD-122	L10D12	B-212	5GA-D12	
C17	1.0			2090150-1		TCZ-1		CNO-510	5TCCB-V1	
C18	56		N750 10%	220332-44	N750-DI 56	TCN-56	C10Q56U	CN7-456	5TCU-Q56S 10% *	
C19	1200			220332-56	BPD-0012	DD-122	L10D12	B-212	5GA-D12	
C20	20000			220332-55	BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C21	10000			220332-23	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA BENDIX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	Switch		2090888-1				■ UE4021-S	Tone
B	2meg	½						Volume, Tap ② 1meg
C	Switch							Power-Off-On
R2	3000Ω	1(WW)	2090181-5				PFL3K	Sensitivity
R3	300Ω	1(WW)	2090181-4					Local Sensitivity
R4	600Ω	1(WW)	219555-14		39-700-200		FL600S	Transistor Bias

■ "STA-LOC" Equivalent: TS-5, RU26T95, OS815, IS1312, US42.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	BENDIX PART No.	NOTES
R5	680K		220604B-684	
R6	220K		220604B-224	
R7	15meg		220604B-156	
R8	3.9meg		220603B-395	
R9	2.2meg		220604B-225	
R10	33K		220604B-333	
R11	33meg		220604B-336	
R12	3.3meg		220604B-335	
R13	330K		220603B-334	
R14	820K		220603B-824	
R15	220K		220603B-224	
R16	100K		220603B-104	
R17	4.7meg		220604B-475	
R18	3300Ω		220604B-332	
R19	39Ω		220603B-390	
R20	820Ω		220603B-821	

ITEM No.	RATING OHMS	RATING WATT	BENDIX PART No.	NOTES
R21	33Ω		220603B-330	
R22	27Ω		220603B-270	
R23	180Ω		220603B-181	
R24	4.5Ω Cold		220629-1	
R25	22meg		220604B-226	
R26	33meg		220603B-336	
R27	3.3meg		220604B-335	
R28	3300Ω		220603B-332	
R29	470Ω		220603B-471	
R30	10meg		220604B-106	
R31	470Ω		220604B-471	
R32	220Ω		220604B-221	
R33	220Ω		220604B-221	
R34	5Ω	2	209948-1	
R35	5Ω	2	209948-1	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	BENDIX PART No.	REPLACEMENT DATA
K1	RF Amp. Cathode Bias	330mmf, 1500Ω		① Sprague PRCS-15

① Some versions may use individual components in this application.

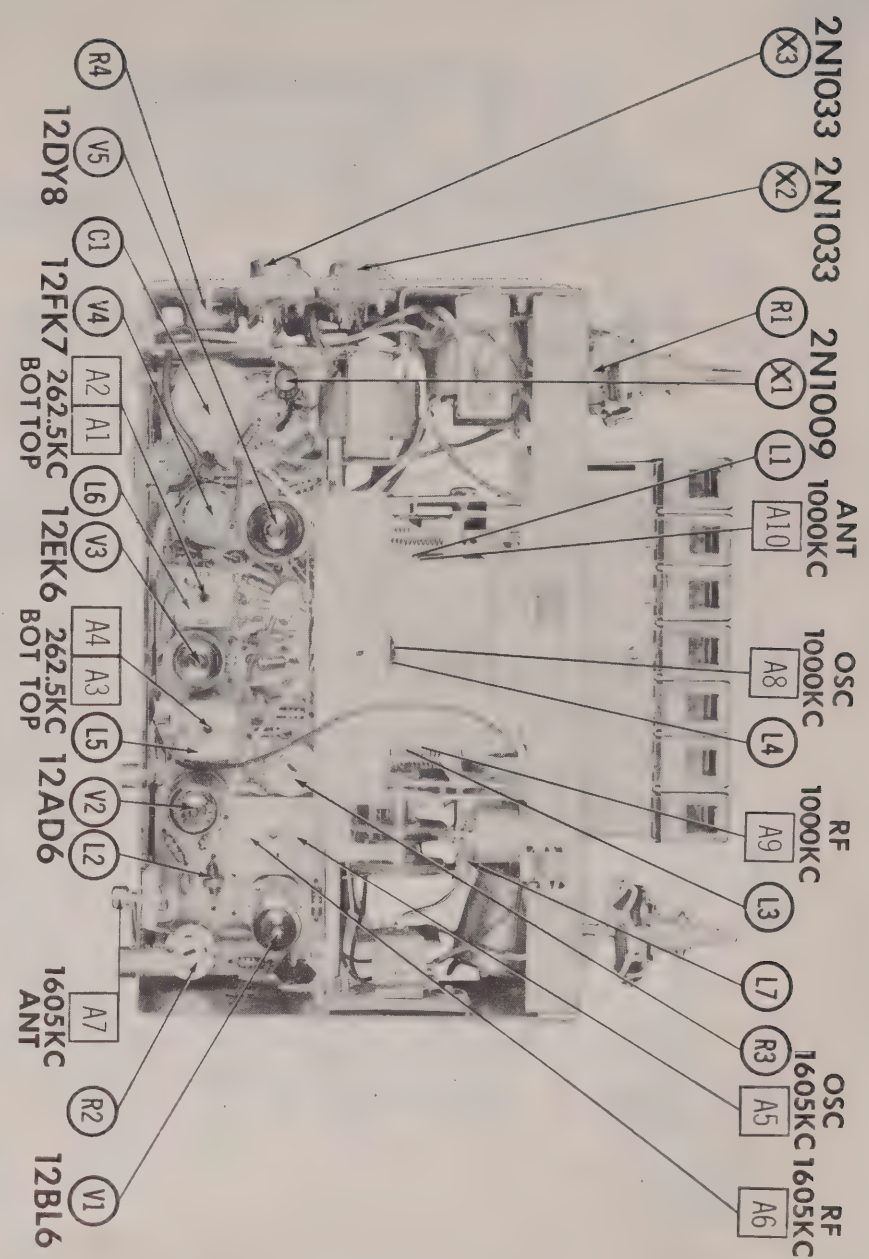
COILS (RF-IF)

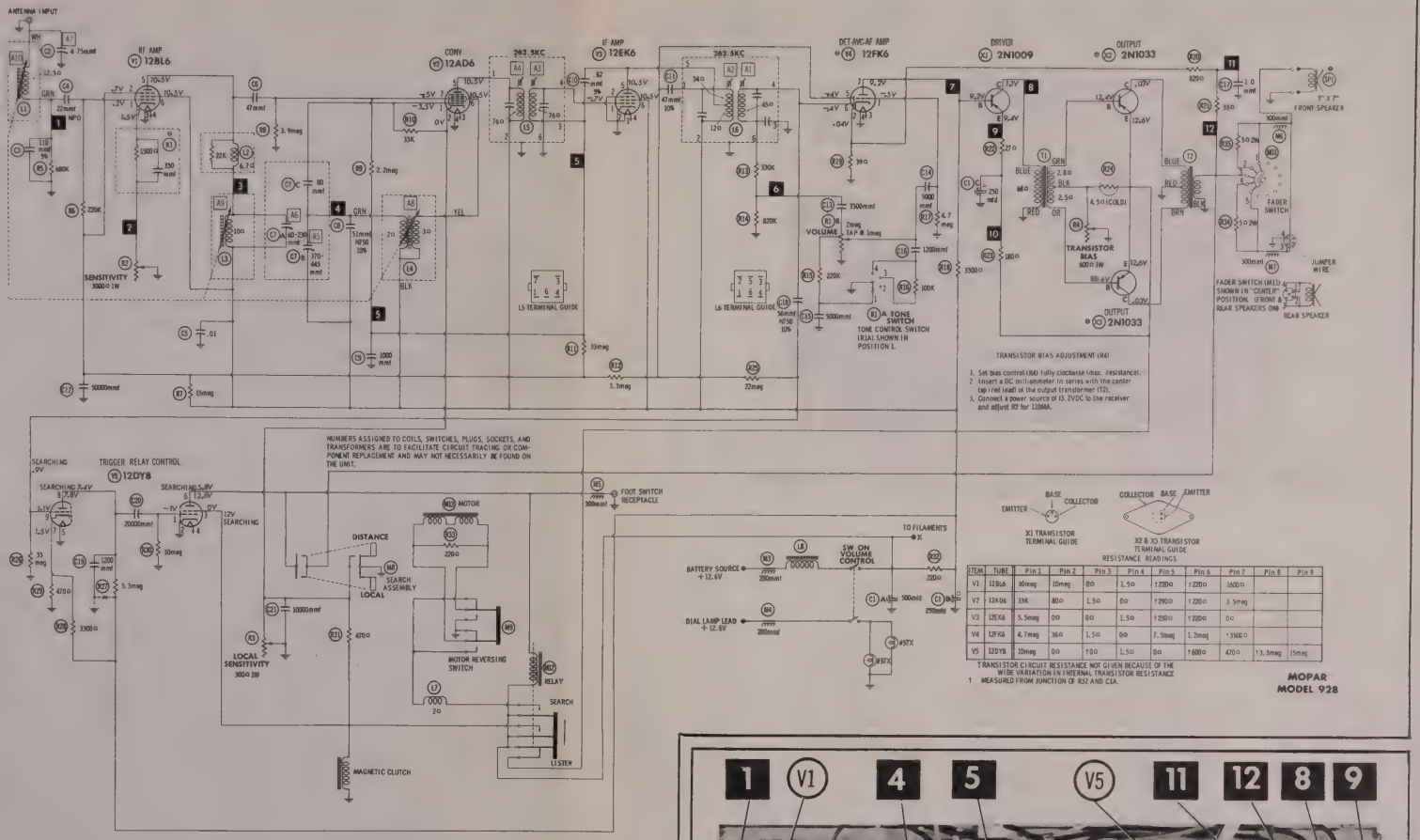
ITEM No.	USE	REPLACEMENT DATA BENDIX PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Antenna Coil	†						
L2	RF Choke	2090088-5						On 22K
L3	RF Coil	†						
L4	Osc. Coil	†						
L5	Input IF	2090876-2						
L6	Output IF	2090877-2						
L7	RF Choke	2090671-1	19-1003	19-1003	BC-564	4608		3.9uh ①

† Part of Tuner Coil Assembly Part #2090131-16.

① IRC Part #CL-1.

CHASSIS—TOP VIEW




ANTENNA INPUT
RF AMP V1 12BL6
CONV V2 12AD6
262.5KC
IF AMP V3 12EK6
262.5KC
DET-AVC-AF AMP V4 12FK6
DRIVER X1 2N1009
OUTPUT X2 2N1033
OUTPUT X3 2N1033
SENSITIVITY 3000Ω 1W
VOLUME TAP @ 1meg
TONE CONTROL SWITCH (R1A) SHOWN IN POSITION L
R1A TONE SWITCH
TRANSISTOR BIAS 600Ω 1W
TRANSISTOR BIAS ADJUSTMENT (R4)
1. Set bias control (R4) fully clockwise (max. resistance).
2. Insert a DC milliammeter in series with the center tap (red lead) of the output transformer (T2).
3. Connect a power source of 13.2VDC to the receiver and adjust R2 for 110MA.
L5 TERMINAL GUIDE
L6 TERMINAL GUIDE
FADER SWITCH (M11) SHOWN IN "CENTER" POSITION. (FRONT & REAR SPEAKERS ON)
FRONT SPEAKER
REAR SPEAKER
JUMPER WIRE
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
TRIGGER RELAY CONTROL V5 12DY8
SEARCHING
12V SEARCHING
DISTANCE
LOCAL
SEARCH ASSEMBLY
LOCAL SENSITIVITY 3000Ω 1W
MOTOR
MOTOR REVERSING SWITCH
RELAY
SEARCH
LISTEN
MAGNETIC CLUTCH
FOOT SWITCH RECEPTACLE
TO FILAMENTS
BATTERY SOURCE +12.6V
DIAL LAMP LEAD +12.6V
SW ON VOLUME CONTROL
X1 TRANSISTOR TERMINAL GUIDE
X2 & X3 TRANSISTOR TERMINAL GUIDE
EMITTER
BASE
COLLECTOR

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BL6	10meg	10meg	0Ω	1.5Ω	†220Ω	†220Ω	1600Ω		
V2	12AD6	33K	80Ω	1.5Ω	0Ω	†270Ω	†220Ω	3.5meg		
V3	12EK6	5.5meg	0Ω	0Ω	1.5Ω	†250Ω	†220Ω	0Ω		
V4	12FK6	4.7meg	36Ω	1.5Ω	0Ω	7.5meg	1.2meg	†350Ω		
V5	12DY8	10meg	0Ω	†0Ω	1.5Ω	0Ω	†600Ω	470Ω	†3.3meg	15meg

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE
† MEASURED FROM JUNCTION OF R32 AND C1A.

MOPAR MODEL 928

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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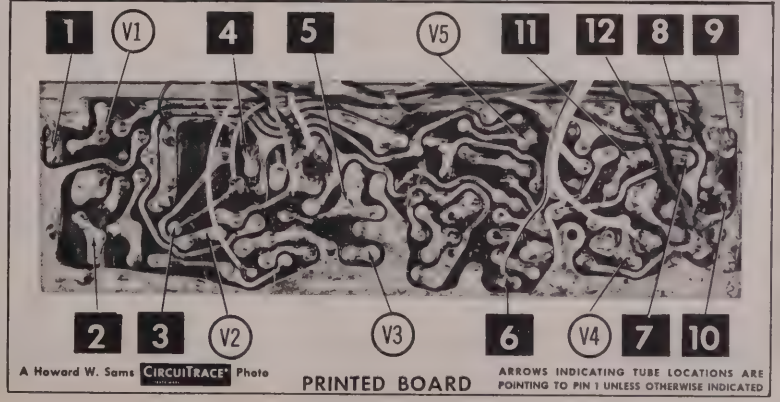

A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

MOTOROLA MODELS S12B, M, SK11B, M, SK12B, M (Ch. HS-706, HS-719)

MOTOROLA MODELS S12B, M, SK11B, M, SK12B, M (Ch. HS-706, HS-719)

MODEL SK11M

MOTOROLA MODELS S12B, M, SK11B, M, SK12B, M (Ch. HS-706, HS-719)

TRADE NAME	Motorola Models SK11B, SK11M, SK12B, SK12M (Preamp. Ch. HS-719, Power Ch. HS-706) S12B, S12M (Right Channel Speaker System)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	AC Operated 5 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 76 Watts, .72 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER VM22RC — SEE SIMILAR V-M 1200A — PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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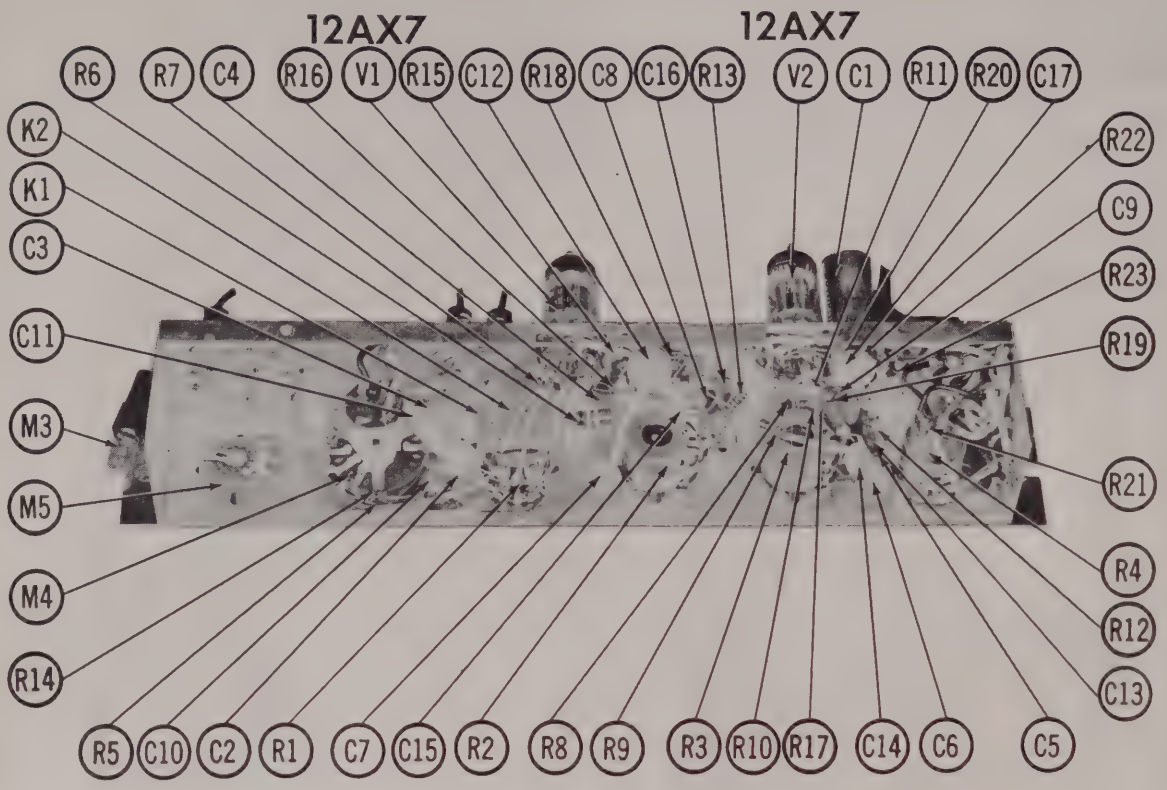
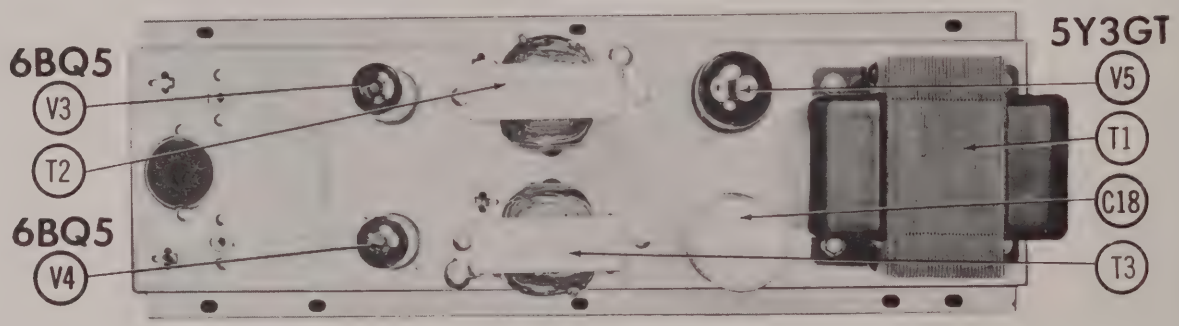
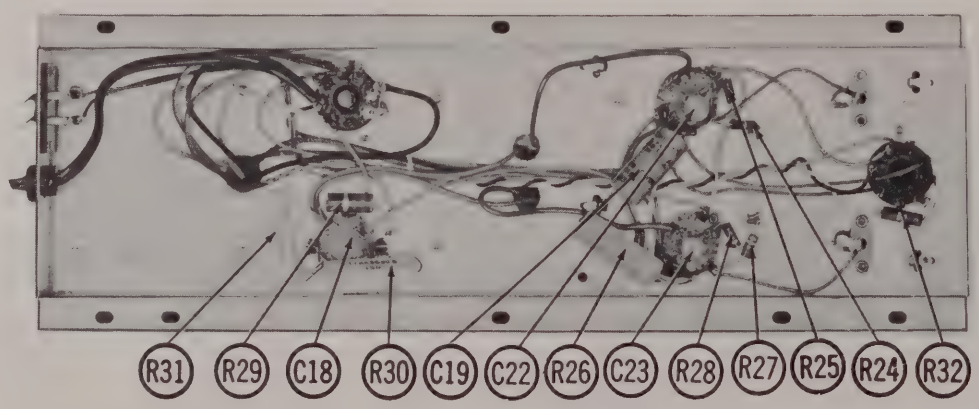
JT172



PREAMPLIFIER CHASSIS



AMPLIFIER CHASSIS - TOP VIEW



AMPLIFIER CHASSIS - BOTTOM VIEW

PRE-AMP PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Left Channel Preamp- Right Channel Preamp.	12AX7	

ITEM No.	USE	TYPE	NOTES
V2	Left Channel AF Amp. - Right Channel AF Amp.	12AX7	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	10	400	23K642196	AFH1-44	A0440	FP142	TMS-49	TVLS-1655	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	2000		10%	21K121836	DI 2000			JL-220	5GA-D2S 10%*	
C3	.02	200		8R121003	P288N-02	DD-203	CUB2S2	GEM-412	2TM-S2	
C4	10000			21R121946	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C5	.02	400		8R121691	P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C6	2000		10%	21K121836	DI 2000			JL-220	5GA-D2S 10%*	
C7	100		N750	21K125723	N750-DI 100	TCN-100	C10T1U	CN7-310	5TCU-T1	
C8	1000		10%	21A121678	DI 1000			JL-210	5GA-D1S 10%*	
C9	10000			21R121946	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C10	2000		10%	21K121836	DI 2000			JL-220	5GA-D2S 10%*	
C11	.02	200		8R121003	P288N-02	DD-203	CUB2S2	GEM-412	2TM-S2	
C12	10000			21R121946	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C13	.02	400		8K128691	P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C14	2000		10%	21K121836	DI 2000	DD-203		JL-220	5GA-D2S 10%*	
C15	100		N750	21K125723	N750-DI 100	TCN-100	C10T1U	CN7-310	5TCU-T1	
C16	1000			21A121678	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C17	10000			21R121946	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	18A642216					Loudness, Left Channel *
B	1meg	½						Loudness, Right Channel *
C	Shaft							
R2A	2meg	½	18A642217	B-76	AD47-2meg-S	Q13-139	†	Treble, Left Channel
B	2meg	½		SR-76		M13-139	†	Treble, Right Channel
C	Shaft			Not Req.	FS-3	Not Req.		
R3A	2meg	½	18A642217	B-76	AD47-2meg-S	Q13-139	†	Bass, Left Channel
B	2meg	½		SR-76		M13-139	†	Bass, Right Channel
C	Shaft			Not Req.	FS-3	Not Req.		
R4A	500K	½	18A642199	B-59	A47-500K-S	Q11-133	U50	Balance
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KR-1	SWE-12	76-1	US-26	

† "STA-LOC" equivalent: FA26A, RU26A, CS3500 * Taps @ 350K & 700K

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R5	1meg		6K124494	
R6	100K	1	6R6328	
R7	820Ω		6K121302	
R8	22K		6K119935	
R9	180K		6K125531	
R10	100K		6K125534	
R11	100K		6K125534	
R12	100K		6K125534	
R13	1800Ω		6K122445	
R14	1meg		6K124494	

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R15	100K	1	6R6328	
R16	820Ω		6K121302	
R17	22K		6K119935	
R18	180K		6K125531	
R19	100K		6K125534	
R20	100K		6K125534	
R21	100K		6K125534	
R22	1800Ω		6K122445	
R23	4700Ω		6K121847	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K1	Loudness Compensation	50mmf, 100mmf, 3000mmf, 3000mmf, 100K, 100K	51B641643	
K2	Loudness Compensation	50mmf, 100mmf, 3000mmf, 3000mmf, 100K, 100K	51B641643	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	MOTOROLA PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		13-TB *				* Includes cartridge & mounting mechanism

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	MOTOROLA PART No.	JENSEN PART No.	WALCO PART No.	
M2		E98 * or E98D ♦ and E98 † or E98XD †♦	W-101STS †† or W-102S †	* Metal † Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Lamp	65R125595	#1847
M4	Switch	40C642110	Compensation, 5 Position (Rotary Wafer Type)
M5	Switch	40B642153	Stereo-Monaural (Rotary Wafer Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	36K642249	Balance, Models SK11B, M
Knob	36K642248	Bass, Treble, Models SK11B, M
Knob	36K642246	Compensator, Models SK11B, M
Knob	36K642245	Function, Models SK11B, M
Knob	36K642247	Loudness, Models SK11B, M
Knob	36K642244	Balance, Models SK12B, M
Knob	36K642243	Bass, Treble, Models SK12B, M
Knob	36K642241	Compensator, Models SK12B, M
Knob	36D642240	Function, Models SK12B, M
Knob	36K642242	Loudness, Models SK12B, M
Cabinet	16E642430	Mahogany, Model SK11M
Cabinet	16K642431	Blond Oak, Model SK11B
Cabinet	16K642326	Blond Oak, Model SK12B
Cabinet	16E642325	Mahogany, Model SK12M
Cabinet	16K642117	Blond Oak, Model S12B
Cabinet	16E642116	Mahogany, Model S12M
Legs	16K642436	Model SK11M
Legs	16K642437	Model SK11B
Legs	16B642102	Models SK12B, SK12M, S12B, S12M

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401

Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

AMP PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V3	Left Channel Output	EL84/ 6BQ5	
V4	Right Channel Output	EL84/ 6BQ5	
V5	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C18A	▲40	350	23K642239	AFH4-04-50	D0034	FP420. 38	TMQ-120	TVL-4635. 3	
B	■40	350							
C	▲40	350							
D	40	350							
C19	50	10	23B636685 ①	SRE12V50	BBR50-25	TT10X50	TD-50-25	TVA-1206	
C20	5	10VNP	23A632250	NP-PRS50V4	BBR10-25 †	TCN105		TVAS-1110 *	
C21	5	10VNP	23A632250	NP-PRS50V4	BBR10-25 †	TCN105		TVAS-1110 *	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
① Not used in some versions; Other versions may use 25mfd. When replacing, use 50mfd.
† Use 2 units. Connect negative terminals together. Connect positive terminals into circuit the same as the original non-polarized unit.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C22	1000		10%	21A121678	DI 1000			JL-220	5BF-D10	①
C23	1000		10%	21A121678	DI 1000			JL-220	5BF-D10	①

① Some versions may use 2000mmf in this application (Part #21K121836).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R24	270K			Note 1
R25	2. 2meg		6K127001	
R26	82Ω	5	17K634893	Note 2
R27	270K			Note 1
R28	2. 2meg		6K127001	

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R29	1200Ω	2	6R476013	
R30	150Ω	5	17K636326	
R31	150Ω	5	17K636326	
R32	.47Ω		17K488266	Note 3

Note 1. Some versions may use 470K in this application (Part #6K121279).
Note 2. R26 used in Ch. HS-706B & HS-706C only.
Note 3. Some versions may use 1Ω 2W or 1. 2Ω 1/ 2W in this application. Replace with . 47Ω.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ . 72A	600 VCT ⓐ . 100A	5V ⓐ 2A	25C642399	22R05U			P-8177 ①	22R05U	
	SEC. 3	SEC. 4	SEC. 5							
	6. 3V ⓐ 1. 1A									

① Drill new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5000Ω	6-8Ω	25B641660	22S58	A-2902 ①	AU-609	A-3337 ①	22S58	S-55X	① Drill new mounting hole
T3	5000Ω	6-8Ω	25B641660	22S58	A-2902 ①	AU-609	A-3337 ①	22S58	S-55X	

SPEAKER

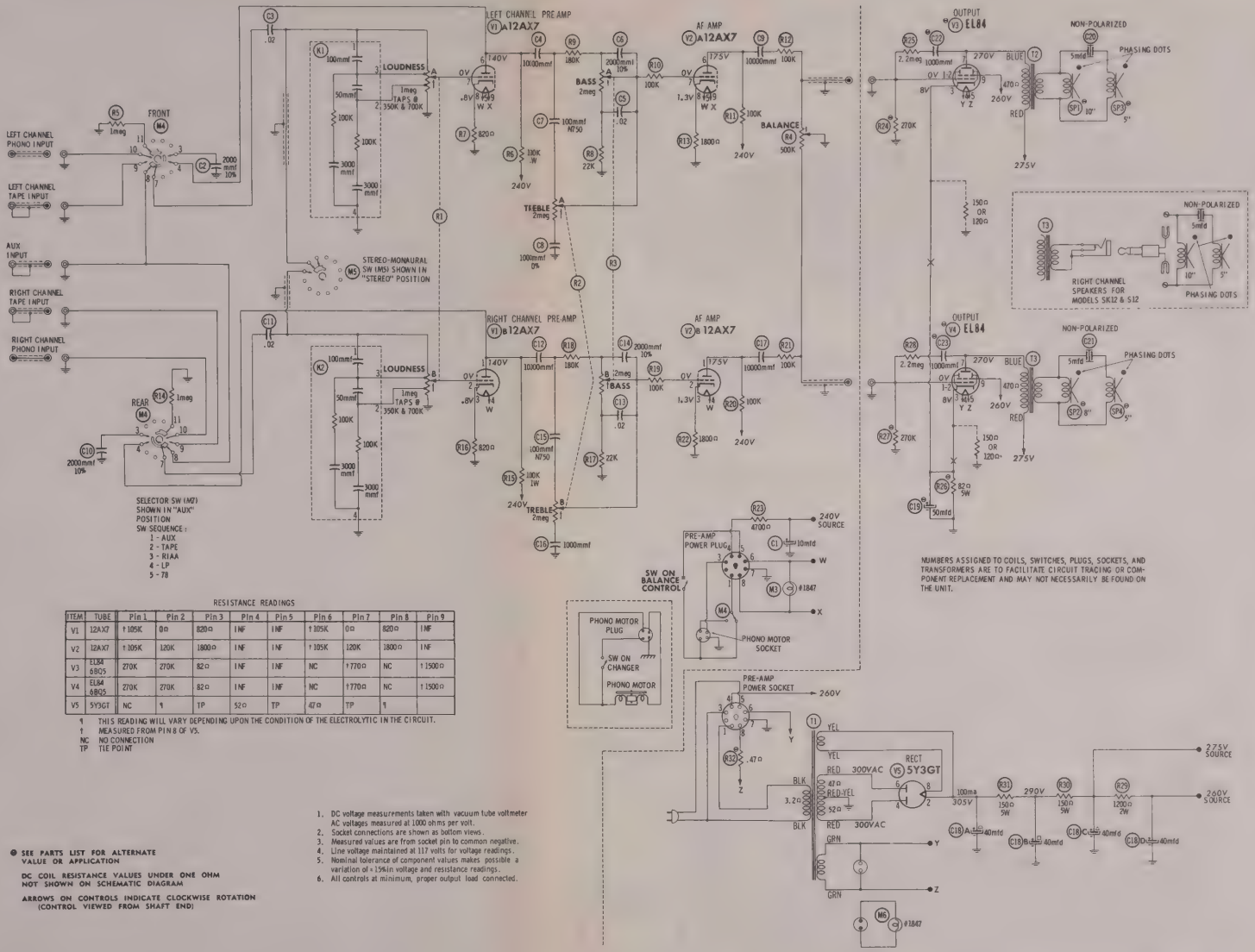
ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	10"	PM	8-10Ω	50C642701 ①	10A6AZ8. 5	① Use in Models SK11, SK12, S12
SP2	8"	PM	6-8Ω	50K636707 ②	8A31Z7. 6	② Used in Model SK11
SP3	5"	PM	8-10Ω	50C638562 ①	5A15TZ8. 8	③ Not used in Model SK12
SP4	5"	PM	8-10Ω	50C638562 ③	5A15TZ8. 8	

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M6	Lamp	65R125595	#1847

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†105K	0Ω	820Ω	INF	INF	†105K	0Ω	820Ω	INF
V2	12AX7	†105K	120K	1800Ω	INF	INF	†105K	120K	1800Ω	INF
V3	EL84 6BQ5	270K	270K	82Ω	INF	INF	NC	†770Ω	NC	†1500Ω
V4	EL84 6BQ5	270K	270K	82Ω	INF	INF	NC	†770Ω	NC	†1500Ω
V5	5Y3GT	NC	¶	TP	52Ω	TP	47Ω	TP	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V5.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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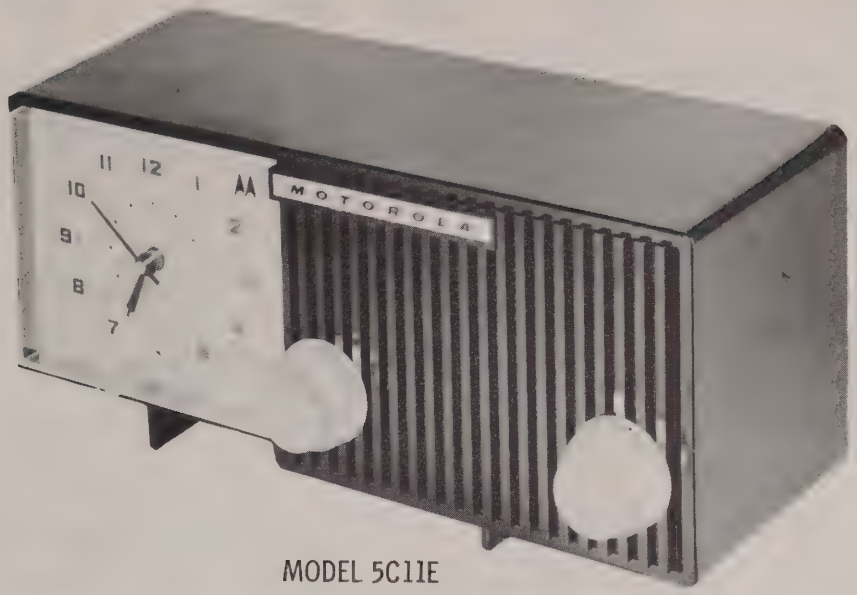
MOTOROLA MODELS S12B, M, SK11B, M, SK12B, M (Ch. HS-706, HS-719)

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

MOTOROLA MODELS 5C11E, 5C12M, P, W (Ch. HS-658)

MOTOROLA MODELS
5C11E, 5C12M, P, W (Ch. HS-658)



MODEL 5C11E

TRADE NAME	Motorola Models 5C11E, 5C12M, 5C12P, 5C12W (Ch. HS-658)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	AC Operated 5 Tube AM Receiver with Electric Clock
POWER SUPPLY	110-120 Volts AC, 60 Cycles
TUNING RANGE—BROADCAST	535KC-1620KC
RATING	29 Watts, .3 Amp. @ 117 Volts AC (Less Clock)

MOTOROLA MODELS
5C11E, 5C12M, P, W (Ch. HS-658)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A4.....GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A5 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 12BE6 (V1). Low side to chassis.	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

DISASSEMBLY

RADIO

1. Remove screws from cabinet back. Remove back.
2. Remove radio knobs.
3. Remove phillips screw near front of tuning gang shaft.
4. Remove screw from Volume control mounting ear.
5. Unsolder clock and speaker leads.
6. Remove chassis.

CLOCK CRYSTAL

1. Remove clock knobs.
2. Insert screwdriver between cabinet and crystal (near "3") to release catch. Pry out crystal.

CLOCK

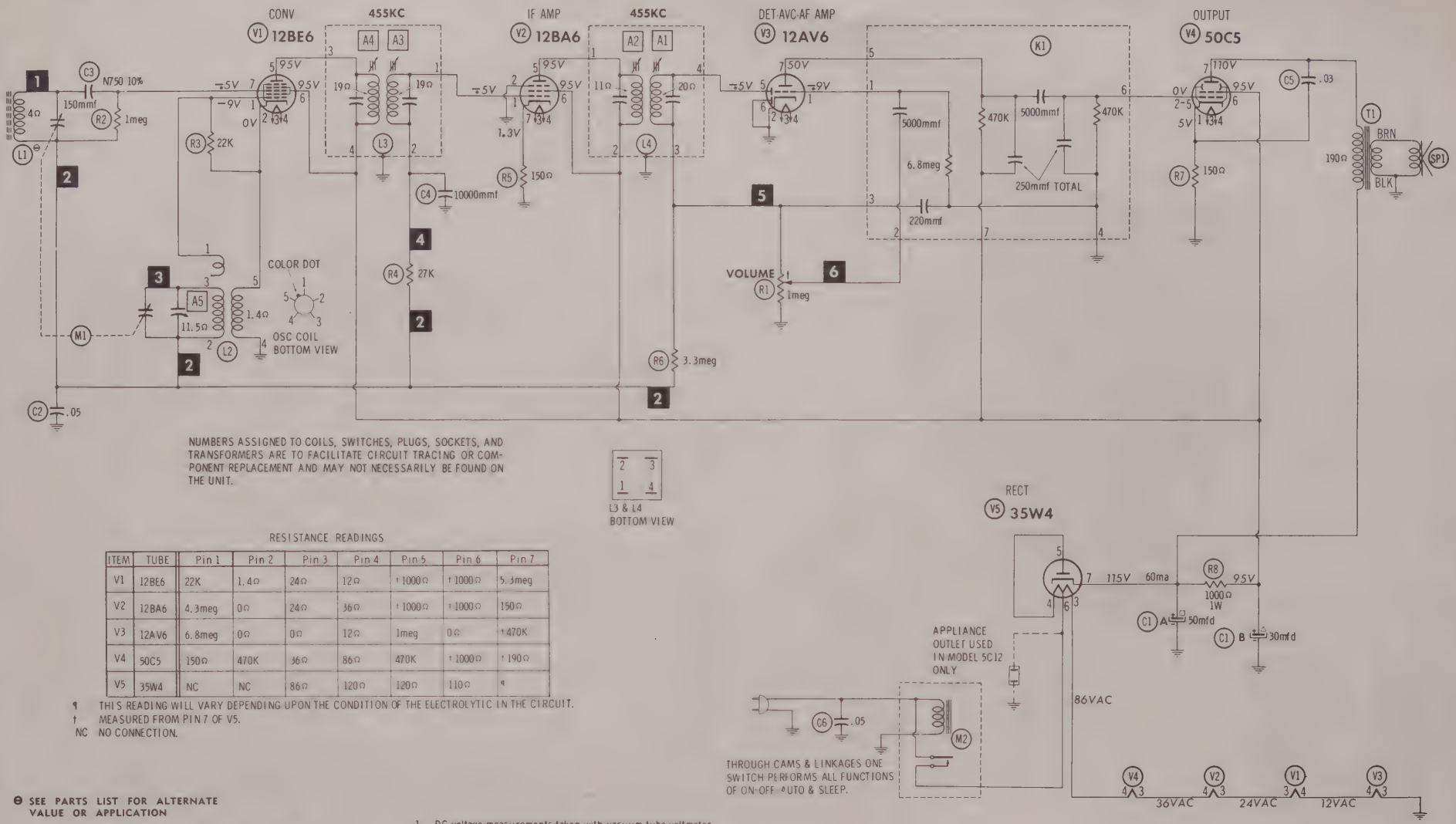
1. Remove crystal.
2. Remove cabinet back.
3. Remove screws from interlock plug and connecting strip.
4. Remove 2 speednuts from rear of clock. Remove clock from front of cabinet.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JG243

SET 454 FOLDER 13



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	1.4Ω	24Ω	12Ω	†1000Ω	†1000Ω	5.3meg
V2	12BA6	4.3meg	0Ω	24Ω	36Ω	†1000Ω	†1000Ω	150Ω
V3	12AV6	6.8meg	0Ω	0Ω	12Ω	1meg	0Ω	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	†1000Ω	†190Ω
V5	35W4	NC	NC	86Ω	120Ω	120Ω	110Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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MOTOROLA MODELS
5C11E, 5C12M, P, W (Ch. HS-658)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amp.	12BA6	
V3	Det.-AVC-AF Amp.	12AV6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	■50	150	23B632015	AFH2-15-05	B0150 ‡	PFP213.1	TDLD-8	PCL-2432	
B	▲30	150							

‡ Use printed circuit adaptors #55277 and 55278.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA							NOTES
	CAP.	VOLT	TOL	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.		
C2	.05	400		8K121268	P4151N-047	DF-503	BC6S47J	ACE615	4SE-S47		
C3	150		N750 10%	21K127652	N750-DI 150	DTN-150	C10T15U	CN7-315	5TCU-T15S 10%*		
C4	10000			21R120853	BPD-01	DD-103	BYA10S1	B-110	5HK-S1		
C5	.03	400		8K122983	P4151N-033	DF-303	BC6S33J	ACE6133	4SE-S33		
C6	.05	400		8K128690	P488N-047	DF-503	CUB4S5	GEM-415	4TM-S5		

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1meg	½	18K633692					Volume

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R2	1meg		6K122324	
R3	22K		6K119405	
R4	27K		6K121300	
R5	150Ω		6K124797	

ITEM No.	RATING		MOTOROLA PART No.	NOTES
	OHMS	WATT		
R6	3.3meg		6K119407	
R7	150Ω		6K124797	
R8	1000Ω	1	6B119404	

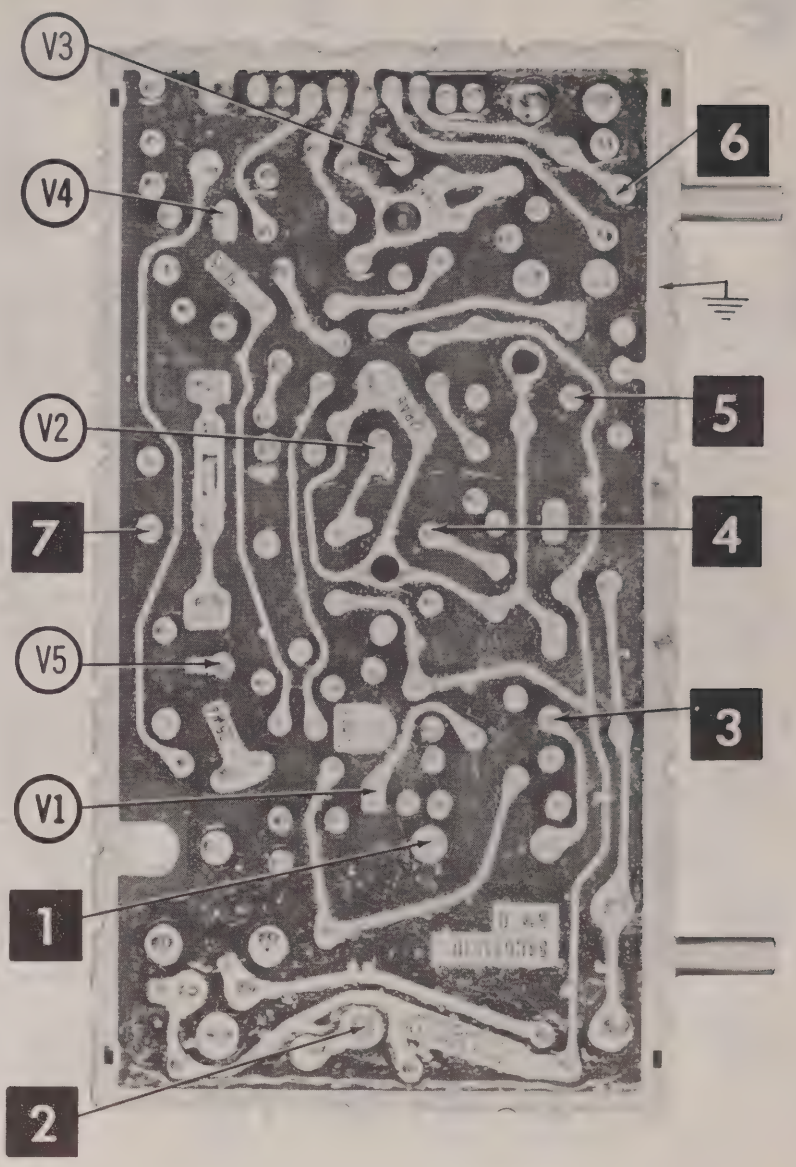
COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA	
K1	Audio Coupling	220mmf, 250mmf, 5000mmf, 5000mmf, 470K, 470K, 6.8meg	51B635833	Aerovox Centralab Sprague	PA-512-3 PC-158 DT-5

PRINTED BOARD

A Howard W. Sams CIRCUITRACE* Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		MOTOROLA PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Ant.	1V638104						Note 1
L2	Osc. Coil	24K636206						
L3	Input IF	24K636016	16-6780	16-6780	BC-356	13-PC9	RF-4	
L4	Output IF	24K638563	16-6780	16-6780	BC-357	13-PC10	RF-4	

Note 1. Model 5C12M use Part #1V641363. Models 5C12P, W use Part #1V641344.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2900Ω	3-4Ω	25K638564	24S53 ①	A-3025 ①	AU-605①	A-3332 ①	24S53 ①	S-12X ①	① Use original channel frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	50K638565	4A1	

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Tuning Cap.	19B632026	2 Section
M2	Clock Assembly	72K640910	(Telechron) Model 5C11E
	Clock Assembly	72K640909	(Telechron) Model 5C12M
	Clock Assembly	72K640908	(Telechron) Models 5C12P, 5C12W
	Printed Board	84C641510	(Less All Components) Add Suffix Letter

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

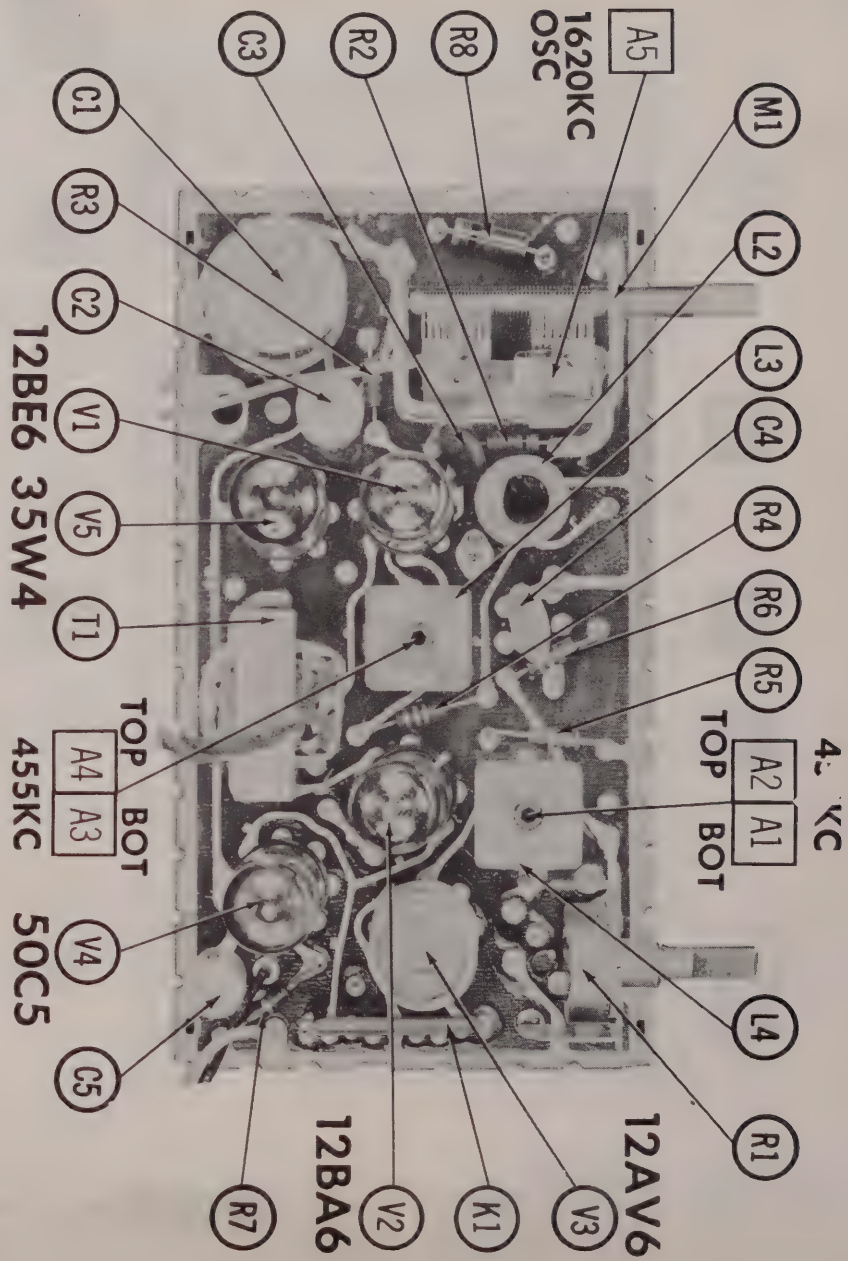
NAME	PART NO.	DESCRIPTION
Knob	36K637750	Tuning
Knob	36K637751	Volume
Knob	36K638216	Clock, Model 5C11E
Knob	36K641340	Clock, Models 5C12M, 5C12P, 5C12W
Cabinet Ass'y.	1V641060	Black, Includes Nameplate, Model 5C11E
Cabinet Ass'y.	1V641047	Mahogany, Includes Nameplate, Model 5C12M
Cabinet Ass'y.	1V641048	Pink, Includes Nameplate, Model 5C12P
Cabinet Ass'y.	1V641049	Antique White, Includes Nameplate, Model 5C12W
Crystal	61K640868	Clock, Model 5C11E
Crystal	61K640869	Clock, Model 5C12M
Crystal	61K640870	Clock, Models 5C12P, 5C12W

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

CHASSIS—TOP VIEW

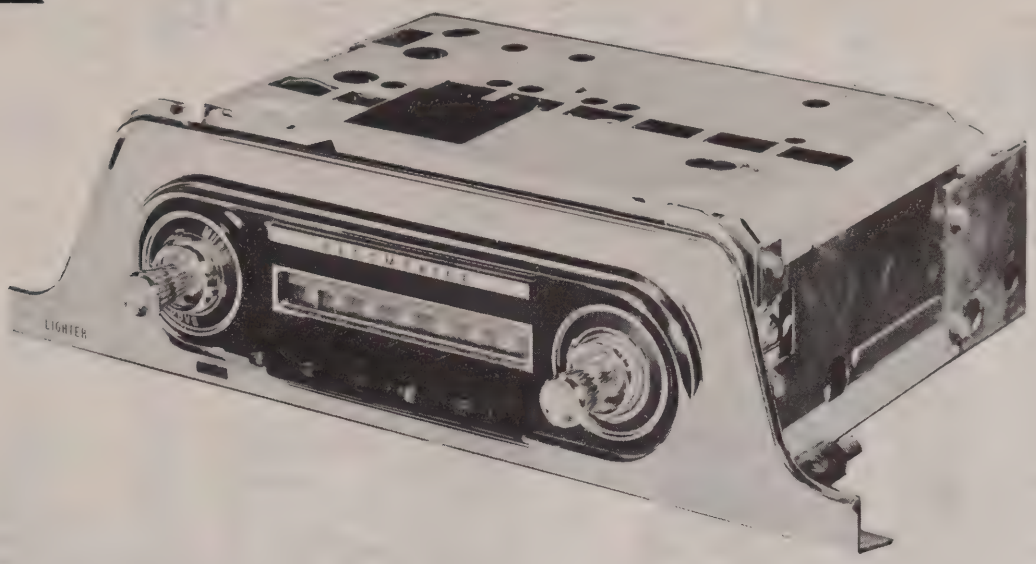


PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER

OLDSMOBILE MODEL 989170

OLDSMOBILE MODEL 989170



TRADE NAME	Oldsmobile Model 989170 (For 1959 Oldsmobile Automobiles)
MANUFACTURER	Delco Radio Div., G.M. Corp., Kokomo, Indiana
TYPE SET	Battery Operated Custom Built 4 Tube AM Automobile Receiver With Transistorized Output
POWER SUPPLY	12 Volt Storage Battery
RATING	2.1 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540KC-1615KC

OLDSMOBILE MODEL 989170

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
A1, A2, A3, A4..... GENERAL CEMENT #8282, 8606, 8606L, 9091
WALSCO #2526, 2541, 2543, 2544
A5, A9, A10..... GENERAL CEMENT #8607, 9291
WALSCO #2520, 2522, 2523, 2524, 2537
A6, A7, A8..... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of converter. Low side to chassis.	262 KC (400∿ Mod.)	High Freq. end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
	Check setting of oscillator core (A5). Rear of core should be 1 5/8" from mounting end of coil form.						
2.	82mmf	High side to antenna receptacle. Low side to chassis.	1615KC	High Freq. end stop	Across voice coil	A6, A7, A8	Adjust for maximum output.
3.	"	"	600KC	600KC Signal	"	A9, A10	"
4.	"	"	1615KC	High Freq. end stop	"	A7, A8	"
	With Receiver tuned to an 1100KC signal, adjust pointer adjustment so that pointer coincides with 1100KC mark on dial.						
	With radio installed in car and antenna fully extended, tune in a weak station near 900KC and adjust A8 for maximum output.						

PUSHBUTTON ADJUSTMENT

1. Pull button to left and out.
2. Tune manually to desired station.
3. Press button in firmly.
4. Repeat for remaining buttons.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JD322

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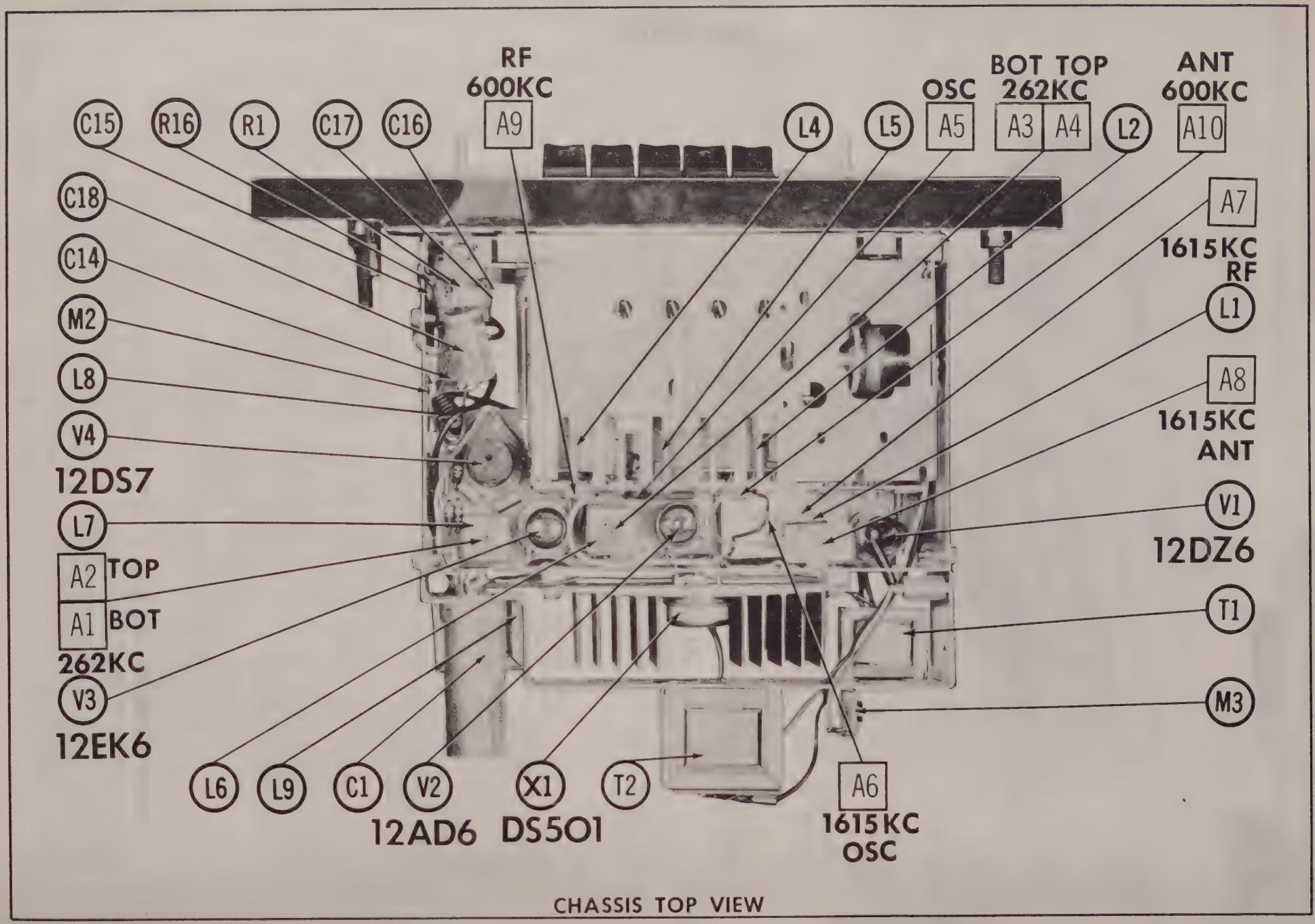
SET 454 FOLDER 14



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12DZ6	
V2	Converter	12AD6	
V3	IF Amplifier	12EK6	
V4	Det. -AVC-AF Amp.	12DS7	

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	DS501	Output					PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▲500	16	7273610	AFH3-54-41		WP300.9		TVLS-3021.5*	
B	■1000	16							
C	4	11.5AC							
C2	1000	1	7271557	PRS6V1000	BBR1000-6	TC310	TD-1000-6	TVA-1104	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	DELCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3				7266240						
C4	.033	200		7273772	P288N-033		CUB6S33	GEM-6133	6TM-S33	
C5	68			6369	BPD-000068	DD-680	L10Q68	UC-5468	5GA-Q68	
C6A										
B				7273693						
C7	39			6366	DI-39	DD-390	L10Q39	UC-5439	5GA-Q39	
C8	220		5%	7273511	1469-00022	TCZ-220	22R5T22		MS-322	
C9	10000			7273774	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C10	.1	200		6690	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C11	.1	200		6690	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C12	47			6367	1468-000047	D6-470	5W5Q47	UC-5447	1FM-447	
C13	47			6367	1468-000047	D6-470	5W5Q47	UC-5447	1FM-447	
C14	.01	400		6610	P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C15	330			6377	BPD-00033	D6-331	L10T33	B-333	5GA-T33	
C16	22		N750 10%	6363	N750-DI 22	DTN-22	C10Q22U	CN7-422	5TCU-Q22S 10%*	
C17	1000			6350	BPD-001	DD-102	BYA10D1M	B-102	5HK-D1	
C18	.47	100		6692	P288N-47		CUB2P47	GEM-2047	2TM-P47	

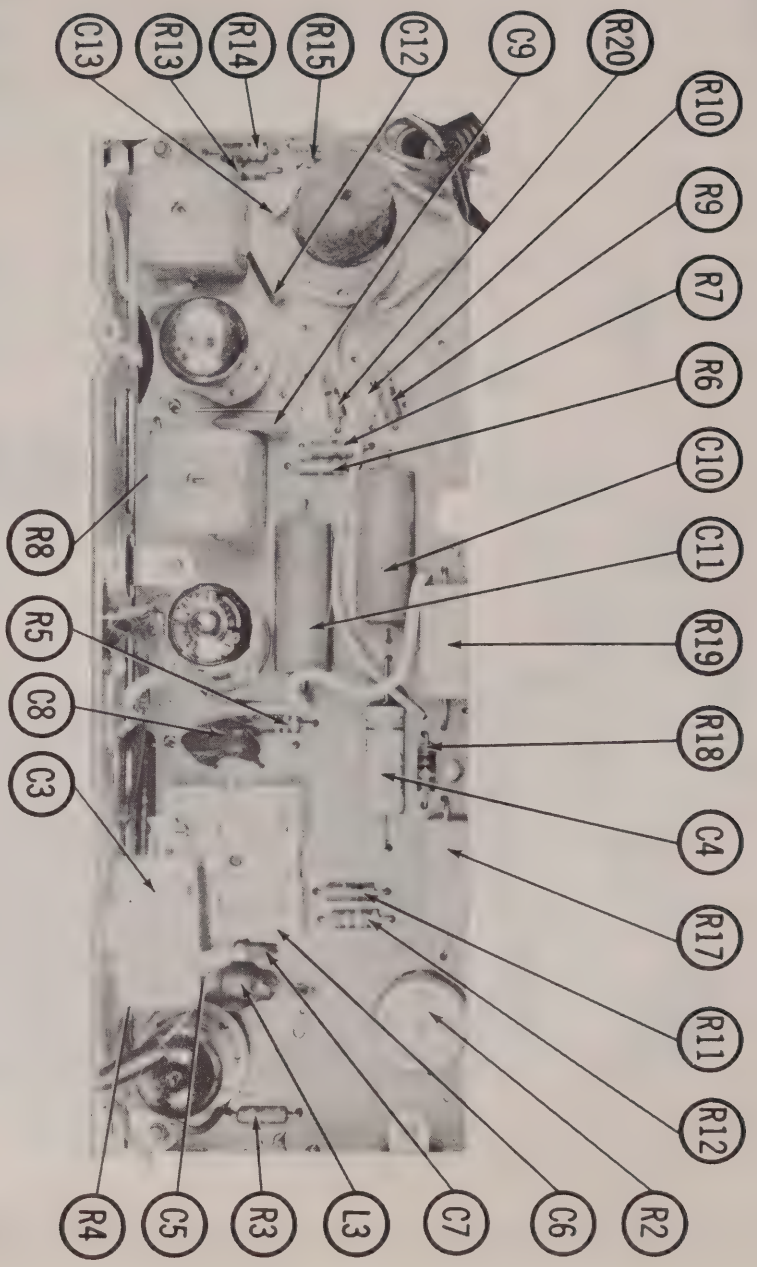
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	5meg *	½	7272855				UE3993S ■	Tone. * Open at center
B	5meg	½						Volume, Tap @ 2meg
C	Switch							Power On-Off
R2	110Ω	1(ww)	7273776					Bias

■ "STA-LOC" equivalent: FI56X, RU56T26, OS1062, IS1812, US-41

PRINTED BOARD—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	DELCO PART No.	NOTES
R3	2.2meg		1239	
R4	10K		1137	
R5	47K		1219	
R6	1.8meg		1238	
R7	1.8meg		1238	
R8	220Ω		1117	
R9	3.3meg		1241	
R10	3.9meg		1242	
R11	1meg		1235	
R12	820K		1234	
R13	18Ω		1104	
R14	47K		1219	
R15	390K		1230	
R16	1meg		1235	
R17	82Ω 5%	5	7274033	
R18	10Ω		1101	
R19	.47Ω	2	7270608	Fuse Type
R20	56Ω		1110	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA DELCO PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Ant. Coil	7255738	19-1004	19-1004	BC-565	4610		
L2	Ant. Coil	1221138						
L3	RF Choke	7269684						1.8MH
L4	RF Coil	1221138						
L5	Osc. Coil	1221151						
L6	Input IF	1221257	16-6756	16-6756	BC-344	13-PH1		
L7	Output IF	1221253						
L8	"A" Lead Choke	1217846						1.4uh

FILTER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	RATINGS DC RES.	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L9	.91A	.81Ω	.010HY	7272827				TC-2		

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO PRI.	TURNS RATIO SEC.	REPLACEMENT DATA DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	13	1	7274068			TA-51			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	REPLACEMENT DATA DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	9Ω Tap @ 3-4Ω	1221290							

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA DELCO PART No.	QUAM PART No.	NOTES
SP1	6" x 9"	PM	3-4Ω	7272810	69A3	

FUSES

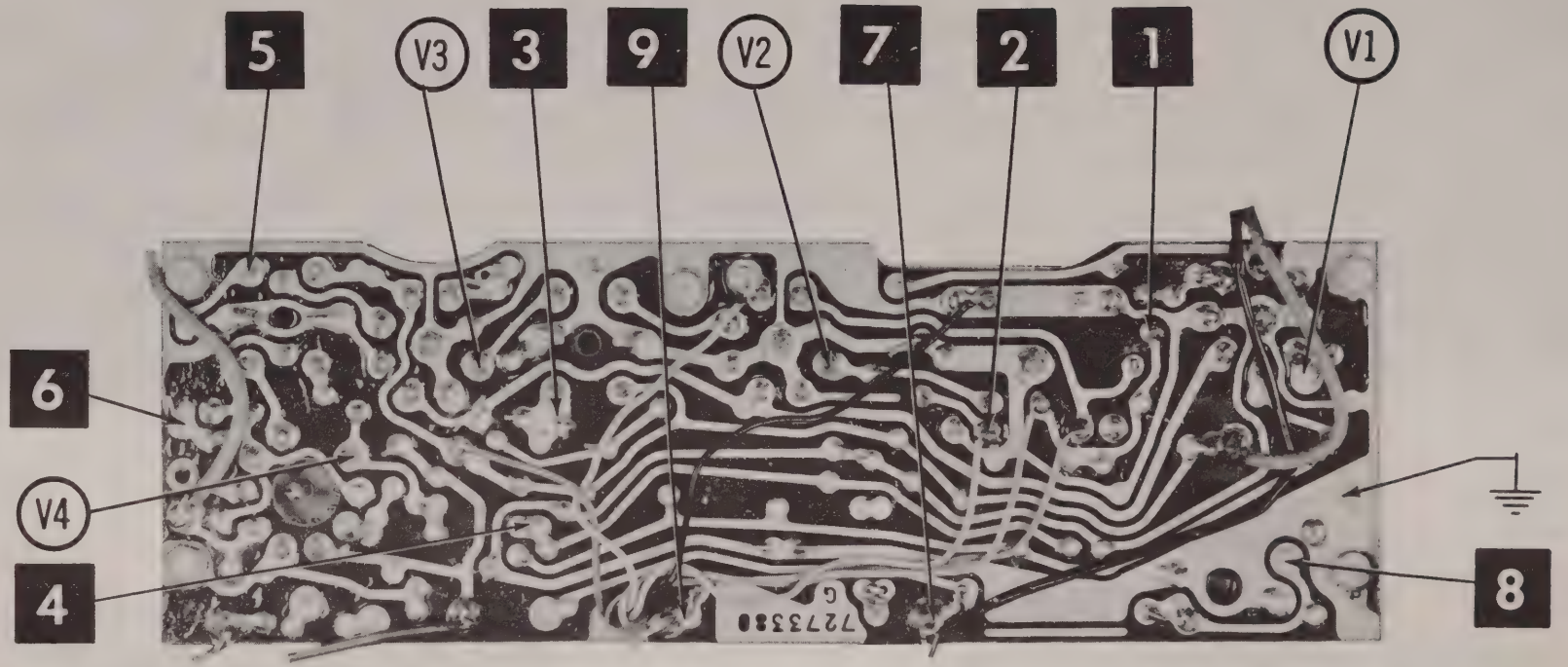
ITEM No.	TYPE	RATING	REPLACEMENT DATA DELCO PART No. FUSE	DELCO PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1		4A	7270622					

MISCELLANEOUS

ITEM No.	PART NAME	DELCO PART No.	NOTES
M2	Spark Plate	7271564	
M3	Switch	7271425	Speaker Interlock
M4	Switch	1221295	Rear Speaker Socket Shorting
	Printed Board	7273380	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661



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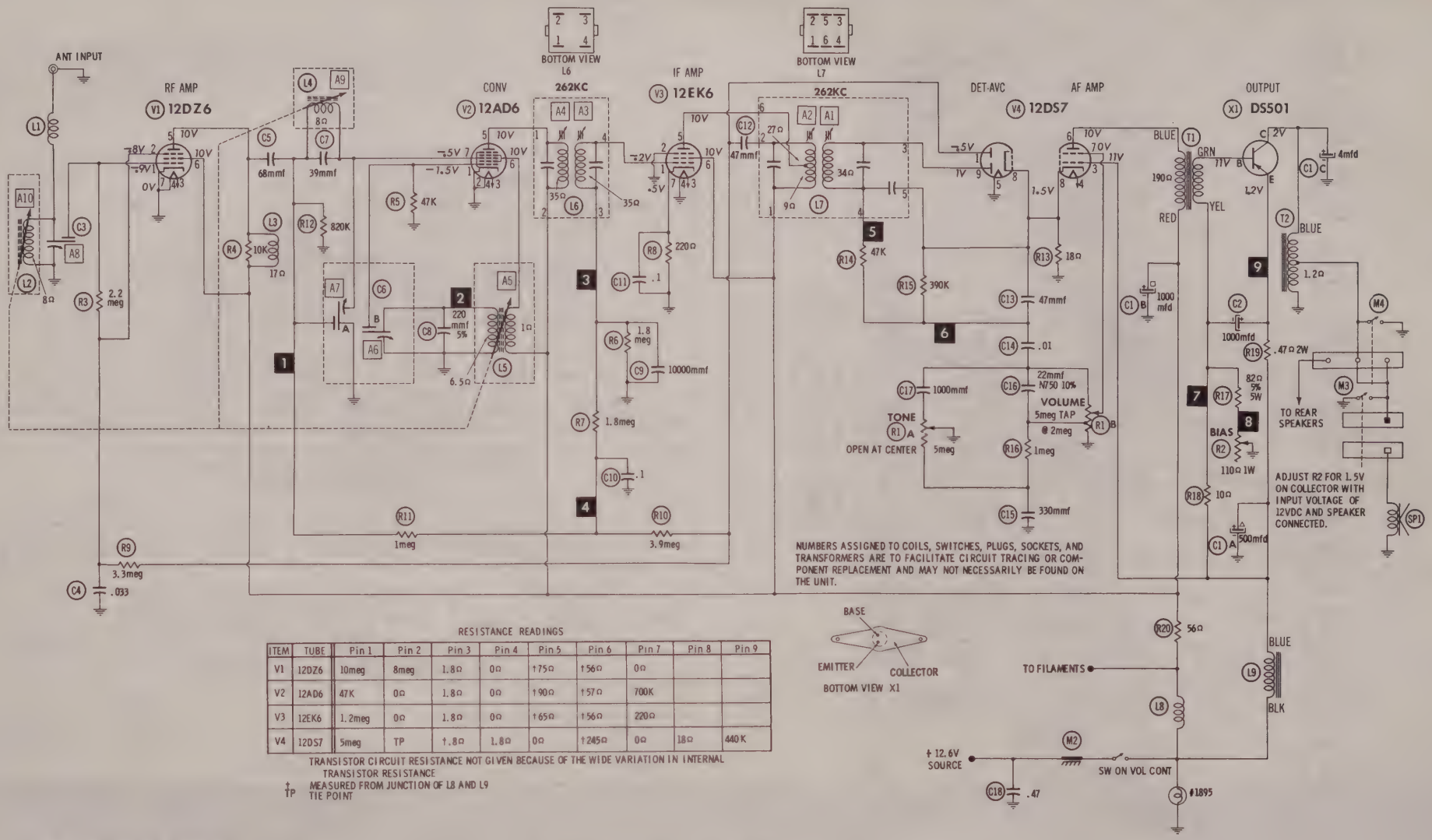
PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12DZ6	10meg	8meg	1.8Ω	0Ω	†75Ω	†56Ω	0Ω		
V2	12AD6	47K	0Ω	1.8Ω	0Ω	†90Ω	†57Ω	700K		
V3	12EK6	1.2meg	0Ω	1.8Ω	0Ω	†65Ω	†56Ω	220Ω		
V4	12DS7	5meg	TP	†.8Ω	1.8Ω	0Ω	†245Ω	0Ω	18Ω	440K

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE

† TP MEASURED FROM JUNCTION OF L8 AND L9 TIE POINT

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes posssible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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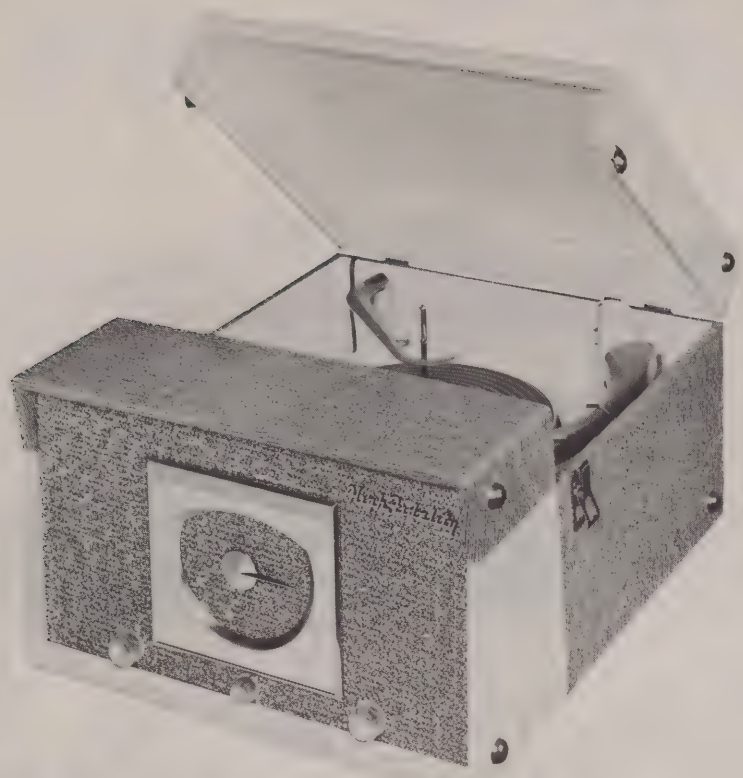
OLDSMOBILE MODEL 989170

PHOTOFACT* Folder



OLYMPIC
MODEL 412

OLYMPIC
MODEL 412

TRADE NAME	Olympic Model 412
MANUFACTURER	Olympic Radio & Tel. Corp., 34-01 38th Ave., Long Island City 1, N. Y.
TYPE SET	AC-DC Operated 5 Tube AM Receiver With 4 Speed Automatic Record Changer
POWER SUPPLY	105 - 120 Volts AC
RATING	28 Watts, .28 Amp. @ 117 Volts AC (Radio)
TUNING RANGE—BROADCAST	540 - 1620KC

FOR SERVICE INFORMATION ON RECORD CHANGER PART #RX5212 - SEE SIMILAR MONARCH UA8 - PHOTOFACT SET 381 FOLDER 11

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A4..... GENERAL CEMENT #5097, 8727
WALSCO #2515
A5, A6..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to antenna stator lug of tuning gang. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1500KC	1500KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	"	Tune to 1500KC signal	"	A6	"

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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SET 454 FOLDER 15

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. - AVC - AF Amp.	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	80	150	CO-25365	PRS150/25V	BBRT8415C	WQ250		TVAS-3439 *	
B	60	150		8040/20					
C	25	25							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.1	400		CO-H-4104	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C3	.02	400		CO-H-4203	P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C4	2000			CCD202M	BPD-002	DD-202	BYA10D2	B-220	5HK-D2	
C5	.01	400		CO-H-4103	P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C6	.1	400		CO-H-4104	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C7	.05	400		CO-B-4473	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C8	.1	400		CO-H-4104	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	PT102	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KR-1	SWE-12	76-1	US-26	Power On-Off

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	OLYMPIC PART No.	NOTES
R2	22K		REB223M	
R3	2.2meg		REB225M	
R4	68Ω		REB680M	
R5	1000Ω	1	REC102M	
R6	150Ω		REB151K	
R7	1meg		REB105M	
R8	1meg		REB105M	

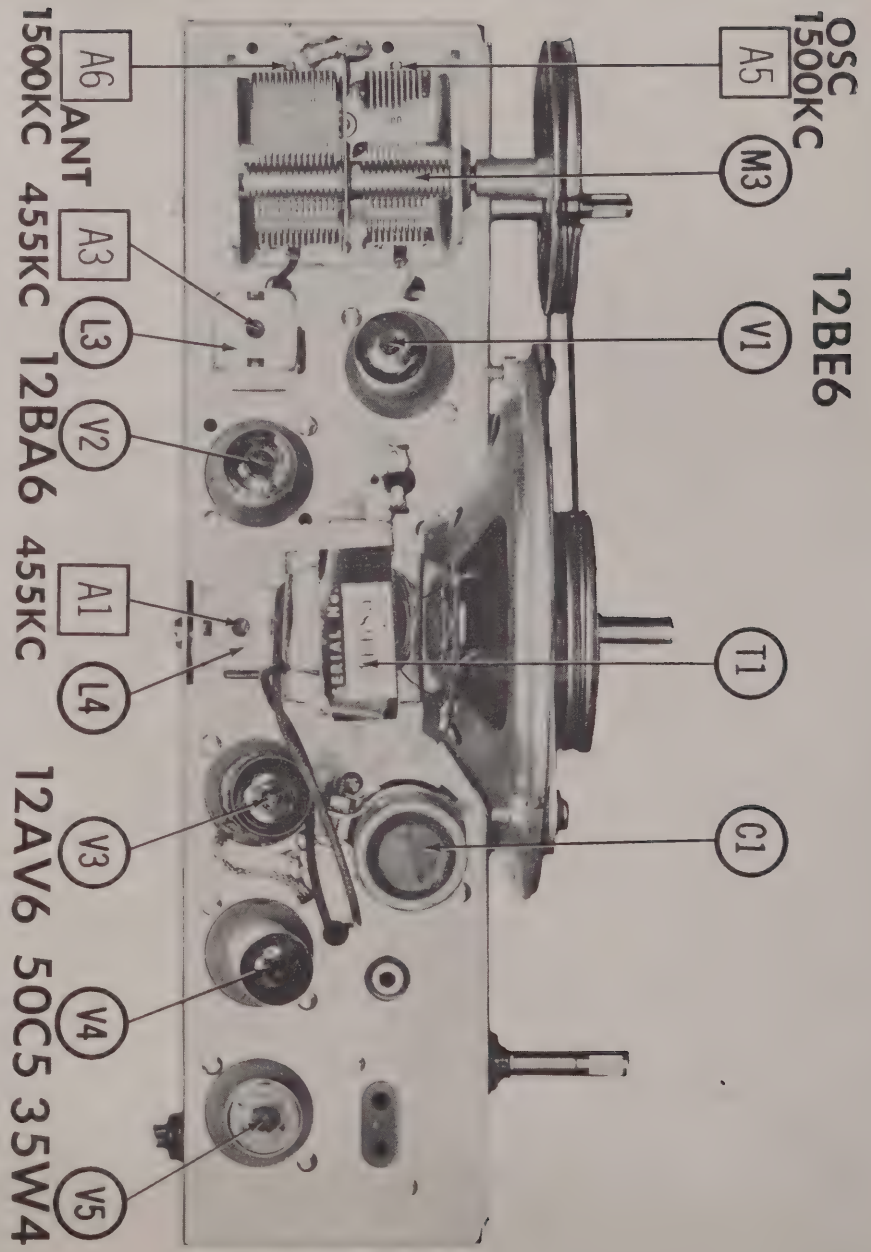
COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	OLYMPIC PART No.	REPLACEMENT DATA
K1	Det. - Audio Net.	220mmf, 220mmf, 2000mmf, 5000mmf, 470K, 470K, 6.8meg	PC-2477-1	Centralab PC-150 Sprague DT-1

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA OLYMPIC PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No	NOTES
L1	Loopstick	LP5359						
L2	Osc. Coil	CL3291						
L3	Input IF	TR1644	16-6758	16-6758	BC-352	12-C1	RF-1	
L4	Output IF	TR1645	16-6758	16-6758	BC-353	12-C2	RF-2	
L5	RF Choke							12 Turns #20 Insulated Wire On C2.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3600Ω	6-8Ω	21CX23	22S86	A-2900	AU-608	A-3850	22S86	S-51X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	OLYMPIC PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	SK4342 ①	4A07 ①	① Connect in Series and Phase.
SP2	4"	PM	3-4Ω	SK4342 ①	4A07 ①	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	OLYMPIC PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		422-TS-TB	N8-1 & N8-3	3	CRA-55 or CRA-55D and CRA-55LP or CRA-55LPD	

ASTATIC AND JENSEN NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	OLYMPIC PART No.	JENSEN PART No.	WALCO PART No.	
M2	(78RPM)	† CRA-55 or ♦ CRA-55D	† W-64MGS or † W-64S or ♦† W-64DS	† Jewel ♦ Diamond
	(LP)	† CRA-55LP or ♦ CRA-55LPD	† W-64MGS or ♦ W-64MGD	

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Tuning Cap.	CV3120	2 Gang; Ant. 26-495mmf, Osc. 21-177mmf
M4	Switch	SW5352	Radio-Phono (Rotary Wafer Type)

CABINETS & CABINET PARTS

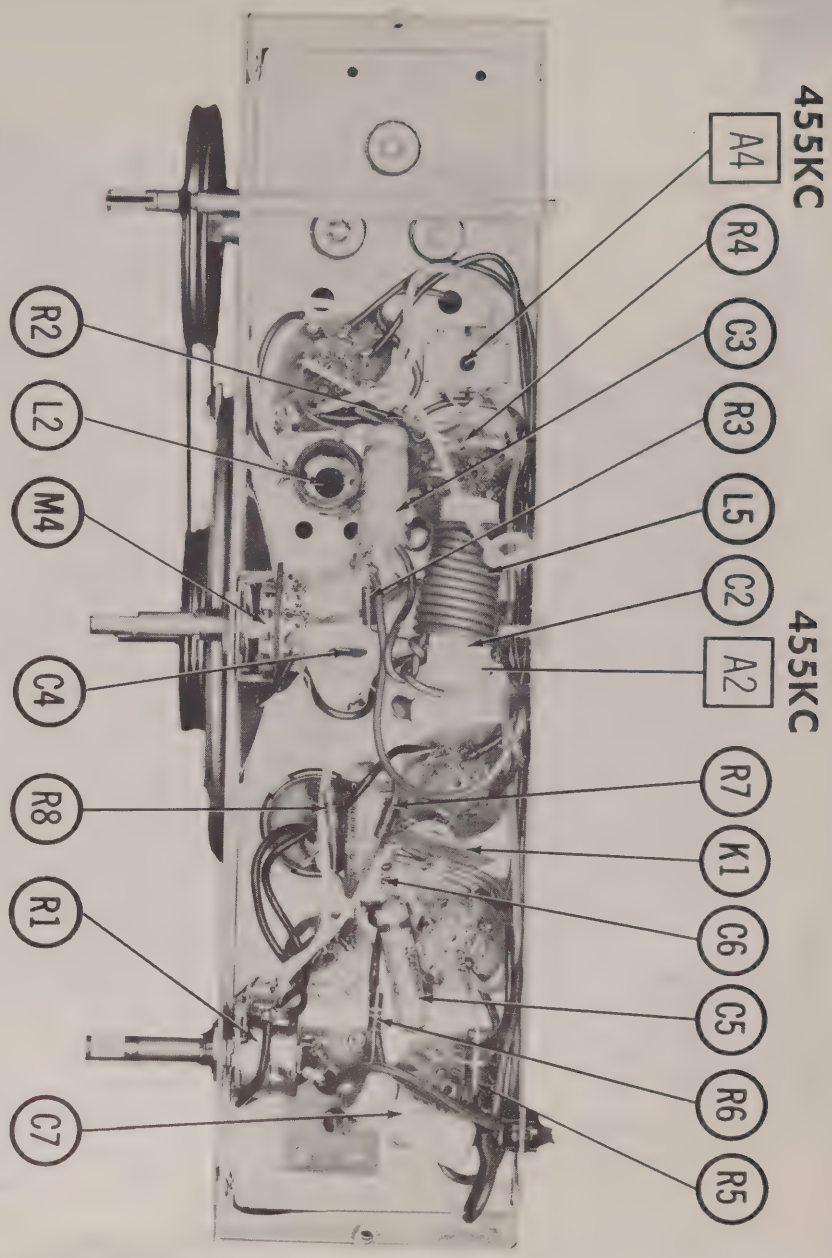
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

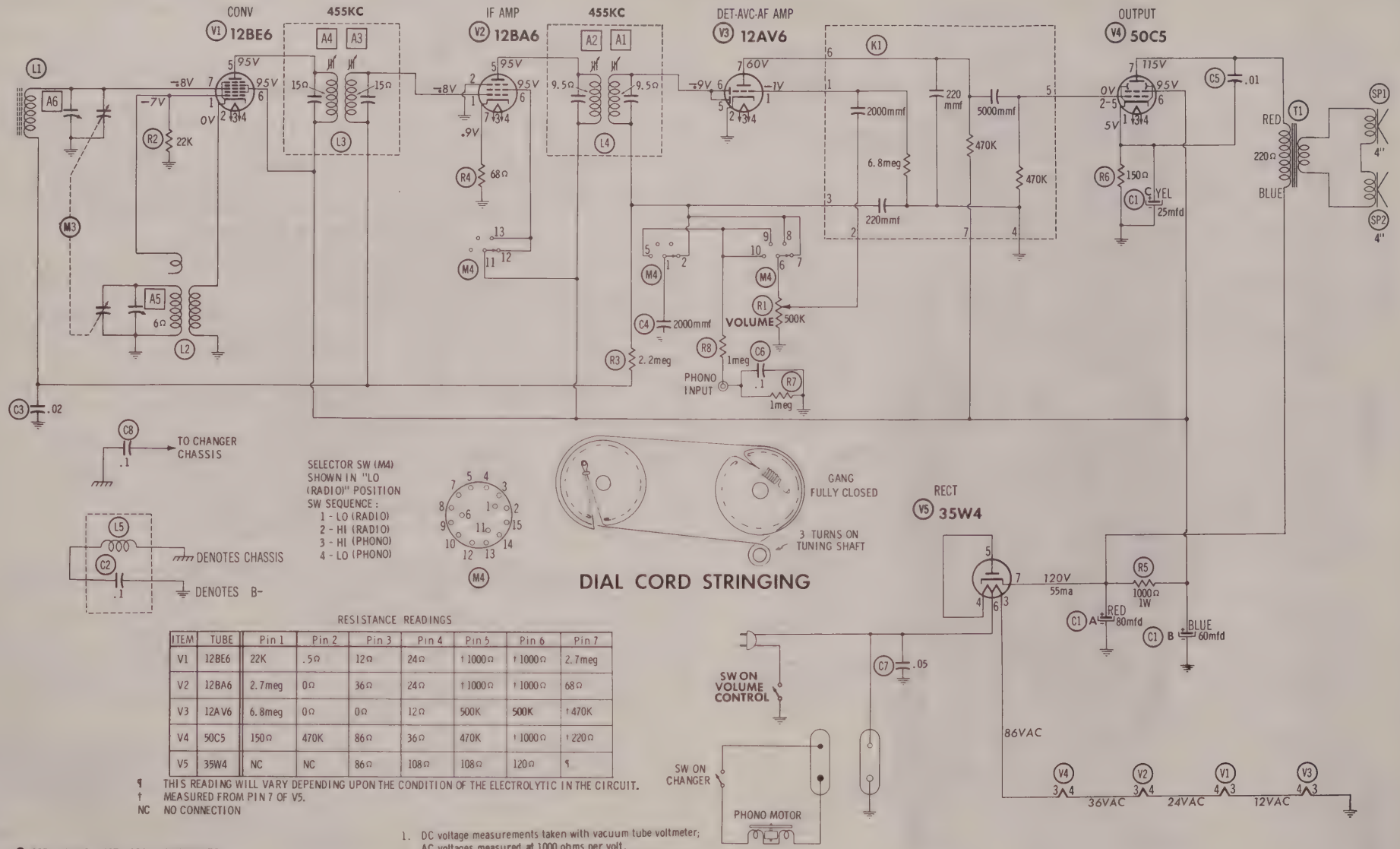
NAME	PART NO.	DESCRIPTION
Knob	KN5366	
Knob	KN5367	
Cabinet	CA25482	

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.5Ω	12Ω	24Ω	†1000Ω	†1000Ω	2.7meg
V2	12BA6	2.7meg	0Ω	36Ω	24Ω	†1000Ω	†1000Ω	68Ω
V3	12AV6	6.8meg	0Ω	0Ω	12Ω	500K	500K	†470K
V4	50C5	150Ω	470K	86Ω	36Ω	470K	†1000Ω	†220Ω
V5	35W4	NC	NC	86Ω	108Ω	108Ω	120Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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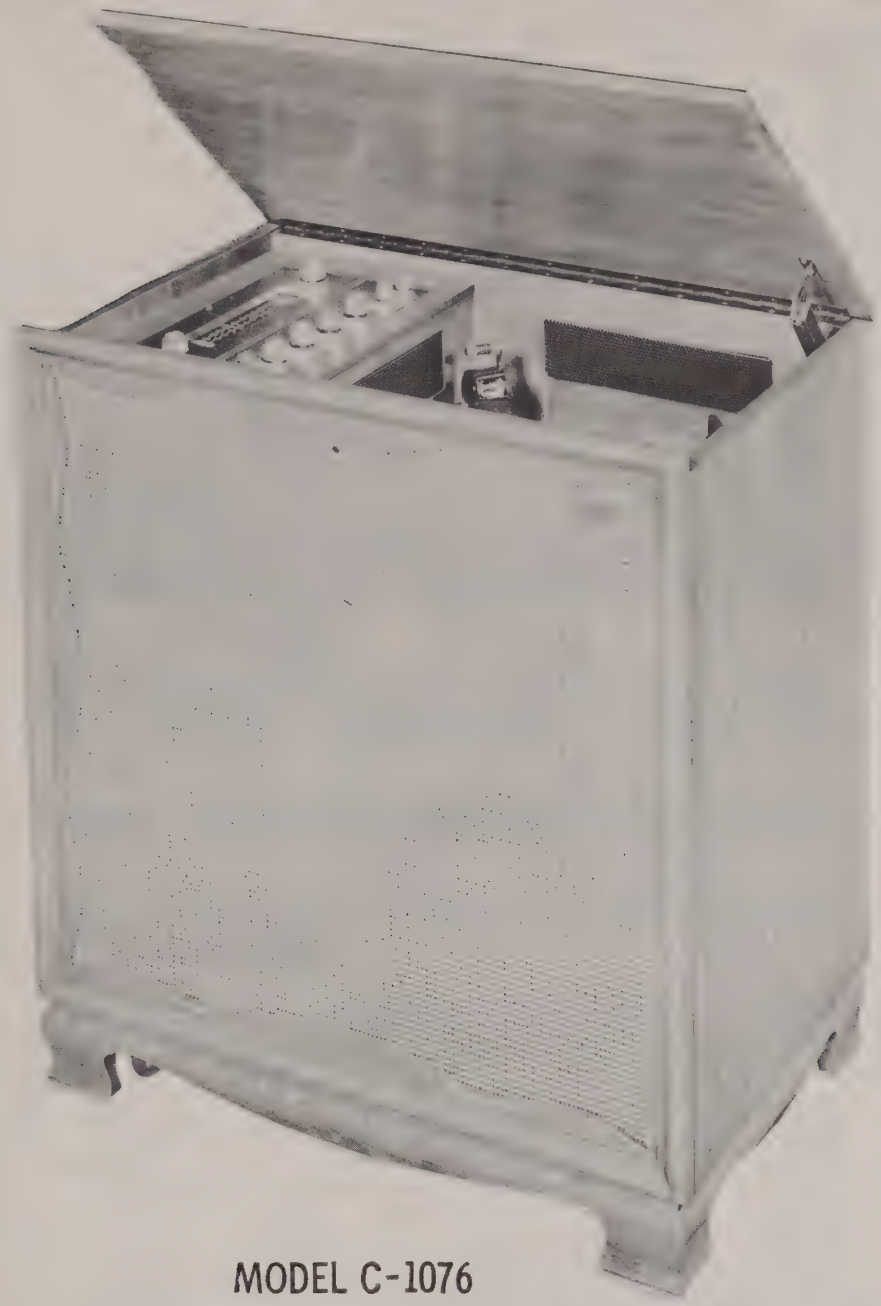
OLYMPIC MODEL 412

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PILOT MODELS C-1070, C-1071, C-1075, C-1076 (Ch. FA-540, SA-232, SP-210)

PILOT MODELS C-1070, C-1071, C-1075, C-1076 (Ch. FA-540, SA-232, SP-210)



MODEL C-1076

PILOT MODELS C-1070, C-1071, C-1075, C-1076 (Ch. FA-540, SA-232, SP-210)

TRADE NAME	Pilot Models C-1070, C-1071, C-1075‡ C-1076* (FM-AM Tuner FA-540‡ Preamp. Ch. SP-210, Power Ch. SA-232)
MANUFACTURER	Pilot Radio Corp., 37-06 36th St., Long Island City 1, N. Y.
TYPE SET	AC Operated FM-AM Tuner With Stereo Phono Amplifier and 4 Speed Automatic Record Changer
POWER SUPPLY	105-125 Volts AC, 60 Cycles RATING 135 Watts, 1.38 Amp. @ 117 Volts AC (Less Tuner & Motor)

* FOR SERVICE INFORMATION ON FM-AM TUNER FA-540 - SEE PHOTOFACT SET 432 FOLDER 9

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE GARRARD RC-88 - PHOTOFACT SET 338 FOLDER 5 OR RECORD CHANGER MANUAL CM-9

SET 454 FOLDER 16

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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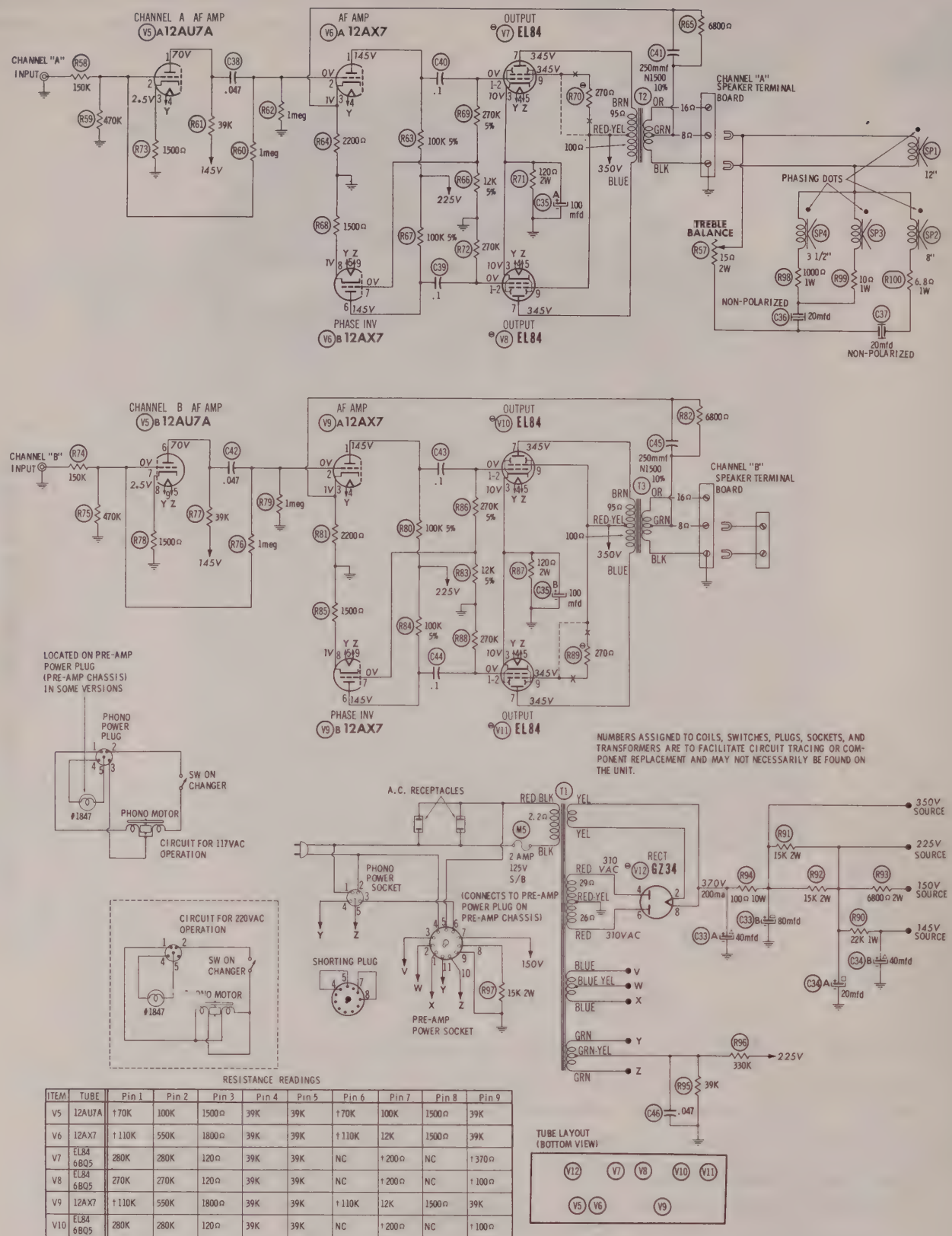
JT203



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V5	12AU7A	†70K	100K	1500Ω	39K	39K	†70K	100K	1500Ω	39K
V6	12AX7	†110K	550K	1800Ω	39K	39K	†110K	12K	1500Ω	39K
V7	EL84 6BQ5	280K	280K	120Ω	39K	39K	NC	†200Ω	NC	†370Ω
V8	EL84 6BQ5	270K	270K	120Ω	39K	39K	NC	†200Ω	NC	†100Ω
V9	12AX7	†110K	550K	1800Ω	39K	39K	†110K	12K	1500Ω	39K
V10	EL84 6BQ5	280K	280K	120Ω	39K	39K	NC	†200Ω	NC	†100Ω
V11	EL84 6BQ5	270K	270K	120Ω	39K	39K	NC	†200Ω	NC	†370Ω
V12	GZ34 5AR4	NC	¶	NC	30Ω	NC	27Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V12.
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. Proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

PILOT MODELS C-1070, C-1071, C-1075, C-1076 (Ch. FA-540, SA-232, SP-210)

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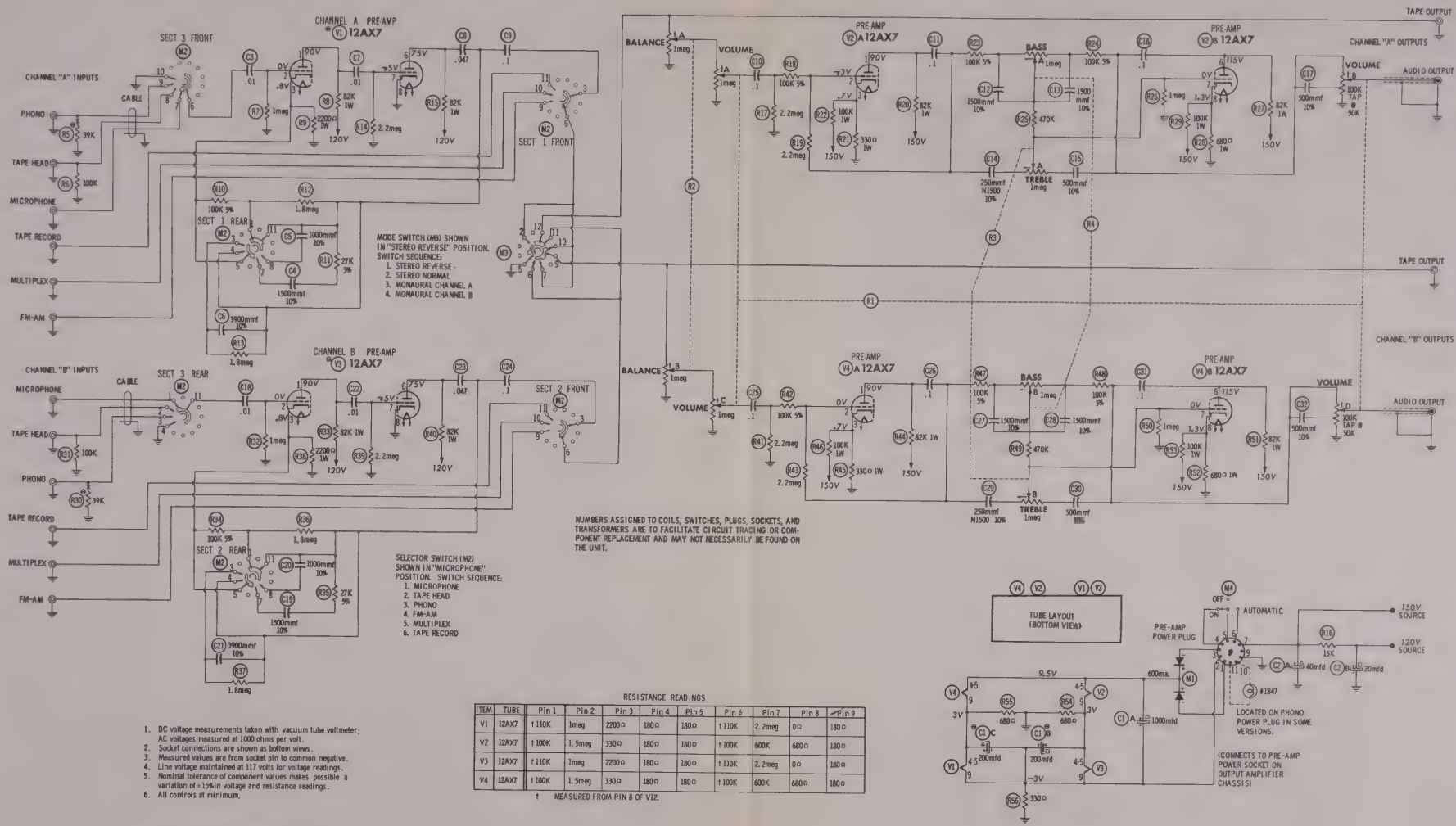
AMP SCHEMATIC



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†110K	1meg	2200Ω	180Ω	180Ω	†110K	2.2meg	0Ω	180Ω
V2	12AX7	†100K	1.5meg	330Ω	180Ω	180Ω	†100K	600K	680Ω	180Ω
V3	12AX7	†110K	1meg	2200Ω	180Ω	180Ω	†110K	2.2meg	0Ω	180Ω
V4	12AX7	†100K	1.5meg	330Ω	180Ω	180Ω	†100K	600K	680Ω	180Ω

† MEASURED FROM PIN 8 OF V12.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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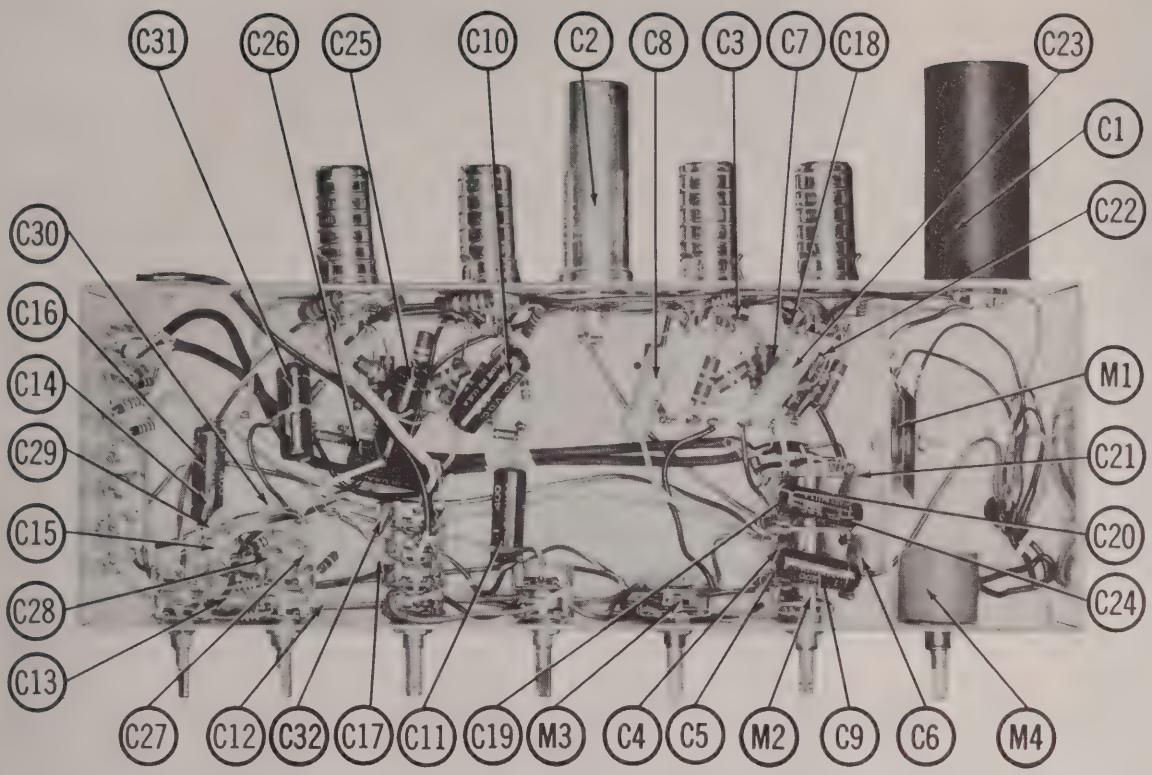
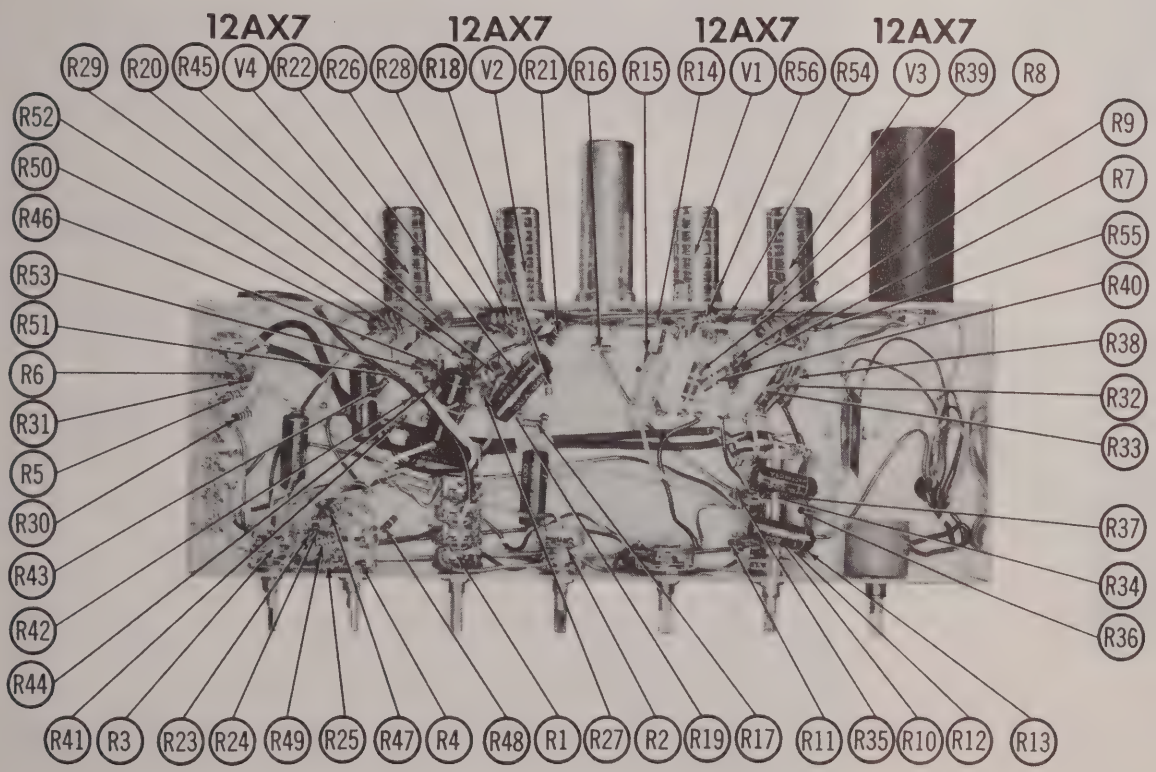
PILOT MODELS C-1070, C-1071, C-1075, C-1076 (Ch. FA-540, SA-232, SP-210)

PREAMP SCHEMATIC



PREAMP. CHASSIS - CAPACITOR & MISC. IDENT.



PREAMP. CHASSIS - TUBE & RESISTOR IDENT.

PRE-AMP PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Channel A Preamp.	12AX7	7025 *
V2	Channel A Preamp.	12AX7	
V3	Channel B Preamp.	12AX7	7025 *
V4	Channel B Preamp.	12AX7	

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	PILOT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲1000	25							
B	■200	25	①						
C	▲200	25	①						
C2A	▲40	350	24-172	AFH3-28-30	CO225	FP330.7	TMT-99	TVL-3638.8	
B	■20	350							

① In some versions C1B and C1C are 250mfd (C1 Part #24-162).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	PILOT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	.01	400			P488N-01	DD-103	CUB4S1	GEM-411	4TM-S1	
C4	1500		10%		DI-1500		1R5D15	JL-215	5GA-D15S 10% *	
C5	1000		10%		DI-1000		1R5D1	JL-210	5GA-D1S 10% *	
C6	3900		10%		1464-0039		1R5D39	JL-239	5GA-D39S 10% *	
C7	.01	400			P488N-01	DD-103	CUB4S1	GEM-411	4TM-S1	
C8	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C9	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C10	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C11	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C12	1500		10%		DI-1500		1R5D15	JL-215	5GA-D15S 10% *	
C13	1500		10%		DI-1500		1R5D15	JL-215	5GA-D15S 10% *	
C14	250		N1500 10%							
C15	500		10%		DI-500	D6-501	5R5T5	MCB245	5GA-T5S 10% *	
C16	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C17	500		10%		DI-500	D6-501	5R5T5	MCB245	5GA-T5S 10% *	
C18	.01	400			P488N-01	DD-103	CUB4S1	GEM-411	4TM-S1	
C19	1500		10%		DI-1500		1R5D15	JL-215	5GA-D15S 10% *	
C20	1000		10%		DI-1000		1R5D1	JL-210	5GA-D1S 10% *	
C21	3900		10%		1464-0039		1R5D39	JL-239	5GA-D39S 10% *	
C22	.01	400			P488N-01	DD-103	CUB4S1	GEM-411	4TM-S1	
C23	.047	400			P488N-047	DD-503	CUB4S47	GEM-4147	4TM-S47	
C24	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C25	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C26	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C27	1500		10%		DI-1500		1R5D15	JL-215	5GA-D15S 10% *	
C28	1500		10%		DI-1500		1R5D15	JL-215	5GA-D15S 10% *	
C29	250		N1500 10%							
C30	500		10%		DI-500	D6-501	5R5T5	MCB245	5GA-T5S 10% *	
C31	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C32	500		10%		DI-500	D6-501	5R5T5	MCB245	5GA-T5S 10% *	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	PILOT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	36-71					Volume, Channel A
B	100K	½						Volume, Chan. A, Tap② 50K
C	1meg	½						Volume, Channel B
D	100K	½						Volume, Chan. B, Tap② 50K
R2A	1meg	½	39-57				† UE4008	Balance, Channel A
B	1meg	½						Balance, Channel B

CONTROLS (cont)

ITEM No.	RATING RESISTANCE	RATING WATTS	PILOT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R3A	1meg	½	37-39	B-69	AD47-1meg-S	Q11-137	‡ UE1707	Treble, Channel A
B	1meg	½		SR-69	Not Req.	M11-137		Treble, Channel B
C	Shaft			Not Req.	FS-3	Not Req.		
R4A	1meg	½	37-39	B-69	AD47-1meg-S	Q11-137	‡ UE1707	Bass, Channel A
B	1meg	½		SR-69	Not Req.	M11-137		Bass, Channel B
C	Shaft			Not Req.	FS-3	Not Req.		

† "STA-LOC" Equivalent: FA16L, RU16R, CS3500. ‡ "STA-LOC" Equivalent: FA16L, RU16L, CS3500.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	PILOT PART No.	NOTES
R5	39K			Note 1
R6	100K			
R7	1meg			
R8	82K	1		
R9	2200Ω	1		
R10	100K 5%			
R11	27K 5%			
R12	1.8meg			
R13	1.8meg			
R14	2.2meg			
R15	82K	1		
R16	15K			
R17	2.2meg			
R18	100K 5%			
R19	2.2meg			
R20	82K	1		
R21	330Ω	1		
R22	100K	1		
R23	100K 5%			
R24	100K 5%			
R25	470K			
R26	1meg			
R27	82K	1		
R28	680Ω	1		
R29	100K	1		
R30	39K			Note 1

Note 1. Some versions may use 100K in this application.

ITEM No.	RATING OHMS	RATING WATT	PILOT PART No.	NOTES
R31	100K			
R32	1meg			
R33	82K	1		
R34	100K 5%			
R35	27K 5%			
R36	1.8meg			
R37	1.8meg			
R38	2200Ω	1		
R39	2.2meg			
R40	82K			
R41	2.2meg			
R42	100K 5%			
R43	2.2meg			
R44	82K	1		
R45	330Ω	1		
R46	100K			
R47	100K 5%			
R48	100K 5%			
R49	470K			
R50	1meg			
R51	82K	1		
R52	680Ω	1		
R53	100K	1		
R54	680Ω			
R55	680Ω			
R56	330Ω			

RECTIFIERS

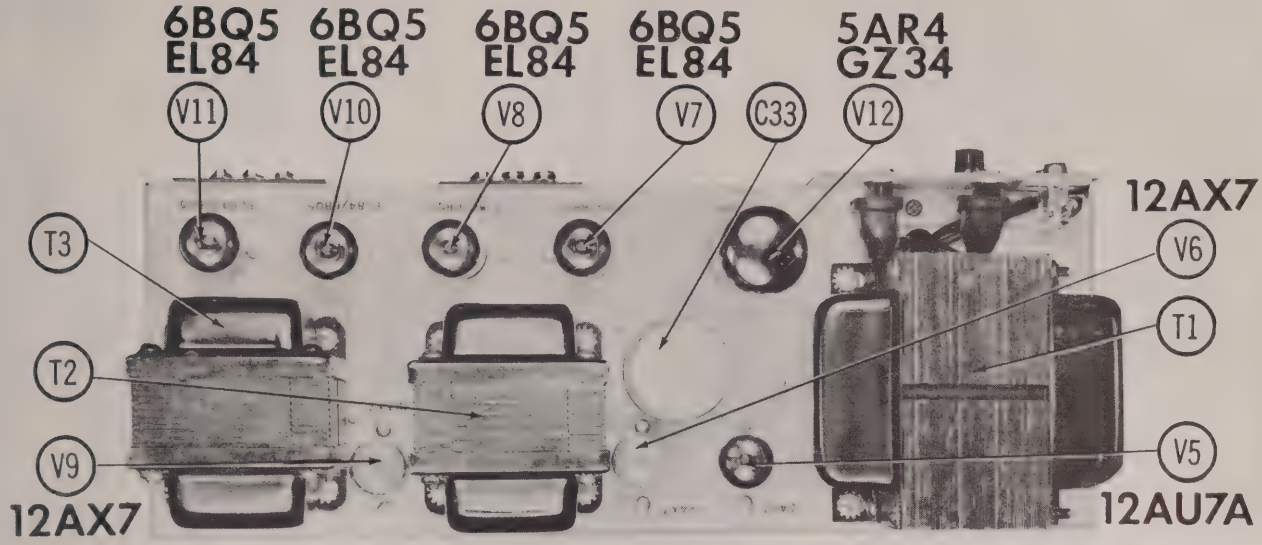
ITEM No.	RATING CURRENT (Measured)	PILOT PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.6A	110-570		C1H ①	4N26-1CN1-RV		① 2 Required

MISCELLANEOUS

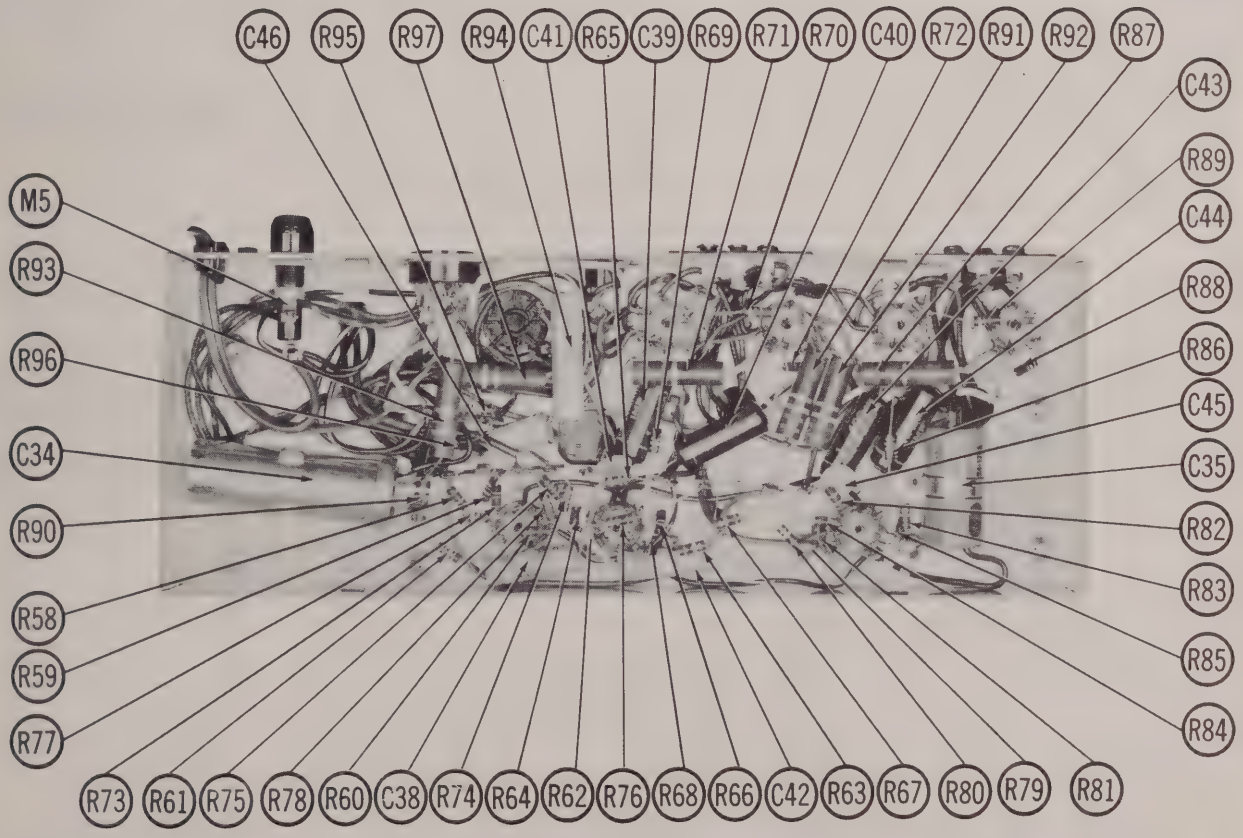
ITEM No.	PART NAME	PILOT PART No.	NOTES
M2	Switch	100-134	Selector Switch (Rotary Wafer Type)
M3	Switch	100-140	Mode (Rotary Wafer Type)
M4	Switch	100-135	Power Off-On-Auto

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors



AMPLIFIER CHASSIS - TOP VIEW



AMPLIFIER CHASSIS - BOTTOM VIEW

AMP PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V5	Channel A AF Amp. - Channel B AF Amp.	12AU7A	
V6	Channel A AF Amp. - Channel A Phase Inv.	12AX7	
V7	Channel A Output	EL84/6BQ5	
V8	Channel A Output	EL84/6BQ5	
V9	Channel B AF Amp. - Channel B Phase Inv.	12AX7	
V10	Channel B Output	EL84/6BQ5	
V11	Channel B Output	EL84/6BQ5	
V12	Rectifier	GZ34/5AR4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C33A	▲40	400	24-124	AFH2-64	B0480	FP229.4	TMD-58	TVL-2675	
B	●80	400							
C34A	■20	350	24-172	AFH3-28-30	C0225	FP330.7	TMT-99	TVL-3638.8	
B	▲40	350							
C35A	100	25	24-170	PRS150V100-100	BBRD101015	TCD2155	TMD-107	TVA-2464	
B	100	25							
C36	20	25NP	29-173	PRS20VNP20	BR505 †	TCN3520			
C37	20	25NP	29-173	PRS20VNP20	BR505 †	TCN3520			

† Use 2 units. Connect negative terminals together. Connect positive terminals into circuit the same as the original non-polarized unit.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C38	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C39	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C40	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C41	250		N1500 10%							
C42	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C43	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C44	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C45	250		N1500 10%							
C46	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PILOT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R57A	15Ω	2(WW)	39-51	WN-150	A43-20	WPK-20	R15L	Treble Balance
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	PILOT PART No.	NOTES
R58	150K			
R59	470K			
R60	1meg			
R61	39K			
R62	1meg			
R63	100K 5%			
R64	2200Ω			
R65	6800Ω			
R66	12K 5%			
R67	100K 5%			
R68	1500Ω			
R69	270K 5%			
R70	270Ω			Note 1
R71	120Ω	2		
R72	270K			
R73	1500Ω			
R74	150K			
R75	470K			
R76	1meg			
R77	39K			
R78	1500Ω			
R79	1meg			

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	PILOT PART No.	NOTES
R80	100K 5%			
R81	2200Ω			
R82	6800Ω			
R83	12K 5%			
R84	100K 5%			
R85	1500Ω			
R86	270K 5%			
R87	120Ω	2		
R88	270K			
R89	270Ω			Note 1
R90	22K	1		
R91	15K	2		
R92	15K	2		
R93	6800Ω	2		
R94	100Ω	10		
R95	39K			
R96	330K			
R97	15K	2		
R98	1000Ω	1		
R99	10Ω	1		
R100	6.8Ω	1		

Note 1. Not used in some versions.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA PILOT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ 1.38A	620VCT @ 200A	5V @ 1.9A	55-68						
	SEC. 3	SEC. 4	SEC. 5							
	23VCT @ .62A	6.3VCT @ 2.8A								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA PILOT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	6000Ω CT	16Ω Tap @ 8Ω	55-59	22S97 ①				22S97 ①	S-22A ①	① Drill new mounting holes.
T3	6000Ω CT	16Ω Tap @ 8Ω	55-59	22S97 ①				22S97 ①	S-22A ①	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA PILOT PART No.	QUAM PART No.	NOTES
SP1	12"	PM	8-9Ω	12JB-27	12A6A	
SP2	8"	PM	8-9Ω	41-51	8A31	
SP3	6"	PM	3-4Ω	41-40A	6A21	
SP4	3½"	PM	7-8Ω @ 3000Ω	41-44	3A15TZ7.4	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA PILOT PART No. FUSE	PILOT PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M5	MDL	2A 125V S/B	111-16		313002, (2A 125V S/B)	342001	MDL2	HKP

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER

TOSHIBA
MODEL 6TR-92

TOSHIBA
MODEL 6TR-92

TOSHIBA
MODEL 6TR-92

TRADE NAME	Toshiba Model 6TR-92
IMPORTER	Excel Corp. of America, 9 Rockefeller Plaza, New York 20, N. Y.
TYPE SET	Battery Operated Transistorized AM Receiver
POWER SUPPLY	9 Volts DC
TUNING RANGE—BROADCAST	540-1600KC
RATING	17MA @ 9 Volts DC (No Signal, Min. Volume) 23MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools: A4 & A6 GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1600KC	"	"	A4	"
3.		"	600KC	600KC	"	A5	Adjust for maximum output while rocking tuning gang. Repeat steps 2 & 3.
4.		"	1400KC	1400KC	"	A6	Adjust for maximum output.

DISASSEMBLY

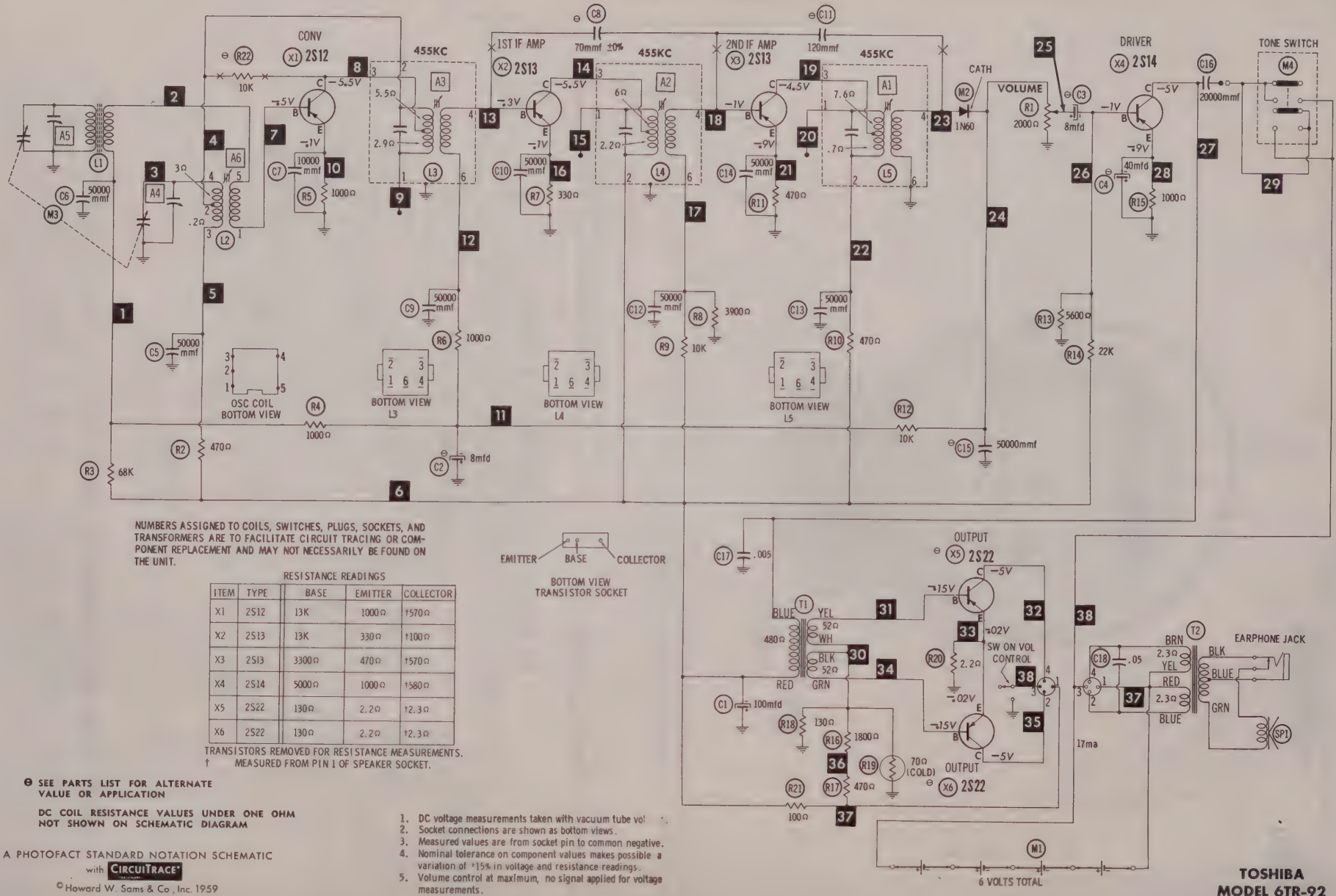
1. Loosen two thumb screws holding handle.
2. Lift top half of cabinet away.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JF95

SET 454 FOLDER 17



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

EMITTER BASE COLLECTOR

BOTTOM VIEW TRANSISTOR SOCKET

RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	2S12	13K	1000Ω	†570Ω
X2	2S13	13K	330Ω	†100Ω
X3	2S13	3300Ω	470Ω	†570Ω
X4	2S14	5000Ω	1000Ω	†580Ω
X5	2S22	130Ω	2.2Ω	†2.3Ω
X6	2S22	130Ω	2.2Ω	†2.3Ω

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
† MEASURED FROM PIN 1 OF SPEAKER SOCKET.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube vo
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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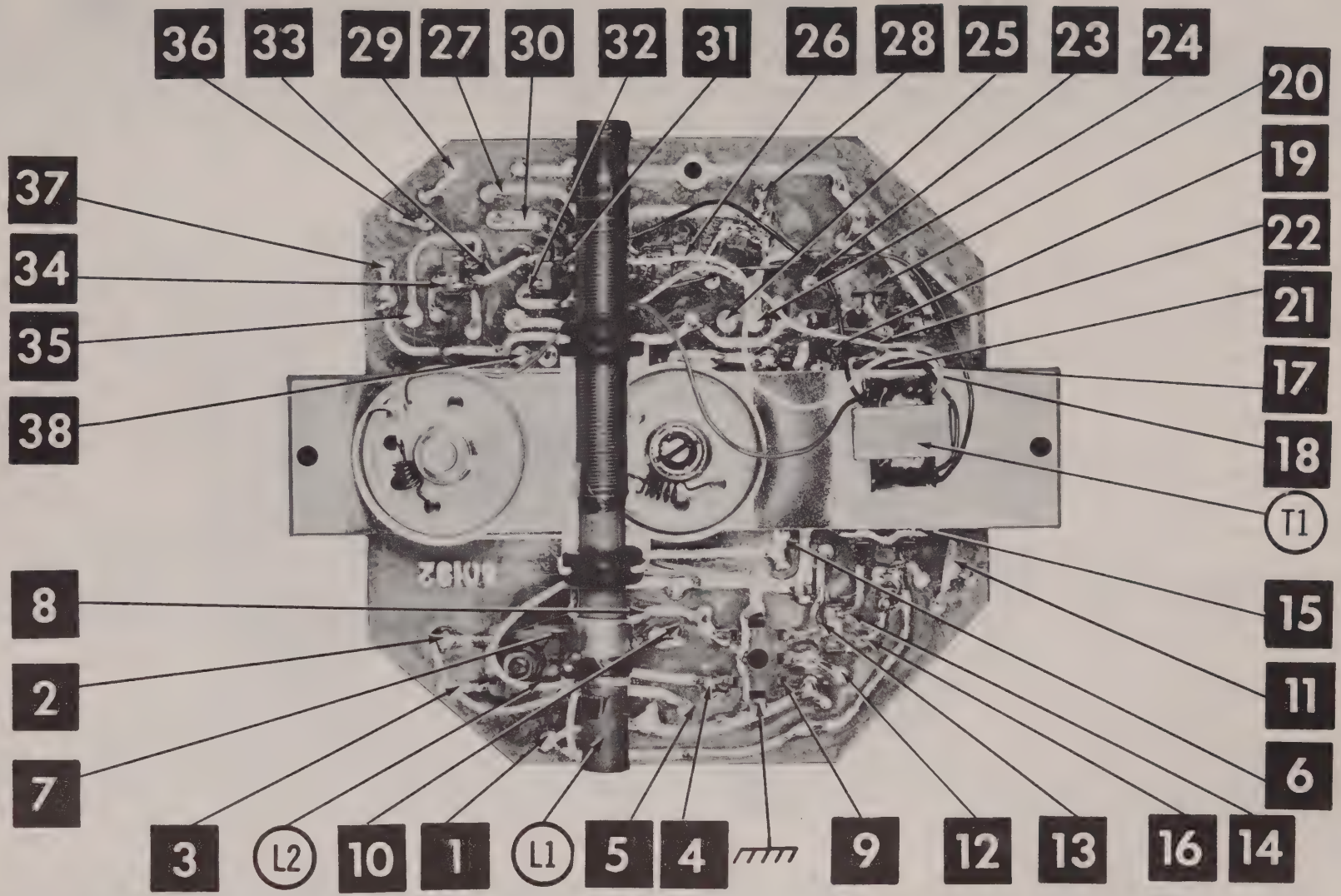
TOSHIBA MODEL 6TR-92



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PRINTED BOARD

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2S12	Converter			2N486		PNP
X2	2S13	1st IF Amplifier			2N482		PNP
X3	2S13	2nd IF Amplifier			2N482		PNP
X4	2S14	Driver			2N362		PNP
X5	2S22 *	Output			2N632		PNP } Matched
X6	2S22 *	Output			2N632		PNP } Matched

* Some versions may use 2S18 in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	TOSHIBA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	100	6		PWE6100	NLW100-6	TT6X100	ML100-6	TE-1102	
C2	8	3	①	PWE3008	EC8-6	TT6X8	ML8-6	TE-1052.5	
C3	8	3	①	PWE3008	EC8-6	TT6X8	ML8-6	TE-1052.5	
C4	40	3	②	PWE3040	EC40-3	TT3X40	ML40-6	TE-1057	

① Some versions may use 10mfd in this application.
② Some versions may use 50mfd in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	TOSHIBA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	50000				BPD-05	DF-503	H-05S5	TA-150	TG-S50	
C6	50000				BPD-05	DF-503	H-05S5	TA-150	TG-S50	
C7	10000				BPD-01	DD-103	H-05S1	TA-110	TG-S10	
C8	70		10%							①
C9	50000				BPD-05	DF-503	H-05S5	TA-150	TG-S50	
C10	50000				BPD-05	DF-503	H-05S5	TA-150	TG-S50	
C11	120				1469-00012	TCZ-120	22R5T12		MS-312	①
C12	50000				BPD-05	DF-503	H-05S5	TA-150	TG-S50	
C13	50000				BPD-05	DF-503	H-05S5	TA-150	TG-S50	
C14	50000				BPD-05	DF-503	H-05S5	TA-150	TG-S50	
C15	50000				BPD-05	DF-503	H-05S5	TA-150	TG-S50	②
C16	20000				BPD-02	DD-203	H-05S2	TA-120	TG-S20	
C17	.005	200			P285N-005	DD-502	BYA10D5	GTM-2247	65P51253	
C18	.05	200			P285N-05	DF-503	CUB2S5	GTM-2147	65P47352	

Note 1. Not used in some versions.
Note 2. Some versions may use 10000mmf in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TOSHIBA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2000Ω	½	33.03					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		TOSHIBA PART No.	NOTES
	OHMS	WATT		
R2	470Ω			
R3	68K			
R4	1000Ω			
R5	1000Ω			
R6	1000Ω			
R7	330Ω			
R8	3900Ω			
R9	10K			
R10	470Ω			
R11	470Ω			
R12	10K			

① Not used in some versions.

ITEM No.	RATING		TOSHIBA PART No.	NOTES
	OHMS	WATT		
R13	5600Ω			
R14	22K			
R15	1000Ω			
R16	1800Ω			
R17	470Ω			
R18	130Ω			
R19	70Ω(Cold)			
R20	2.2Ω			
R21	100Ω			
R22	10K			①

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		TOSHIBA PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick							
L2	Osc. Coil							
L3	1st IF Trans.							
L4	2nd IF Trans.							
L5	3rd IF Trans.							

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC. 1	TOSHIBA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	5	1	20168						
		SEC. 2							
	5	1							

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.[1]	IMPEDANCE SEC.	REPLACEMENT DATA TOSHIBA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	32Ω	3.2Ω Tap ⓐ 3Ω	20167							
	PRI. 2 32Ω									

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA TOSHIBA PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	SP-4001A	4A15	

BATTERIES

ITEM No.	VOLTAGE	TOSHIBA PART No.	REPLACEMENT DATA BURGESS "A"	BURGESS "B"	EVEREADY "A"	EVEREADY "B"	MALLORY "A"	MALLORY "B"	NOTES
M1	6V	UM-1 *		2R①		A100①		M-13R① RM-42R②	① 4 Used ② Mercury Type, 4 Used

* Alternate Part #SUM-1

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA TOSHIBA PART No.	CBS PART No.	SYLVANIA PART No.	NOTES
M2	1N60		1N60	1N60	Detector (Pigtail)

MISCELLANEOUS

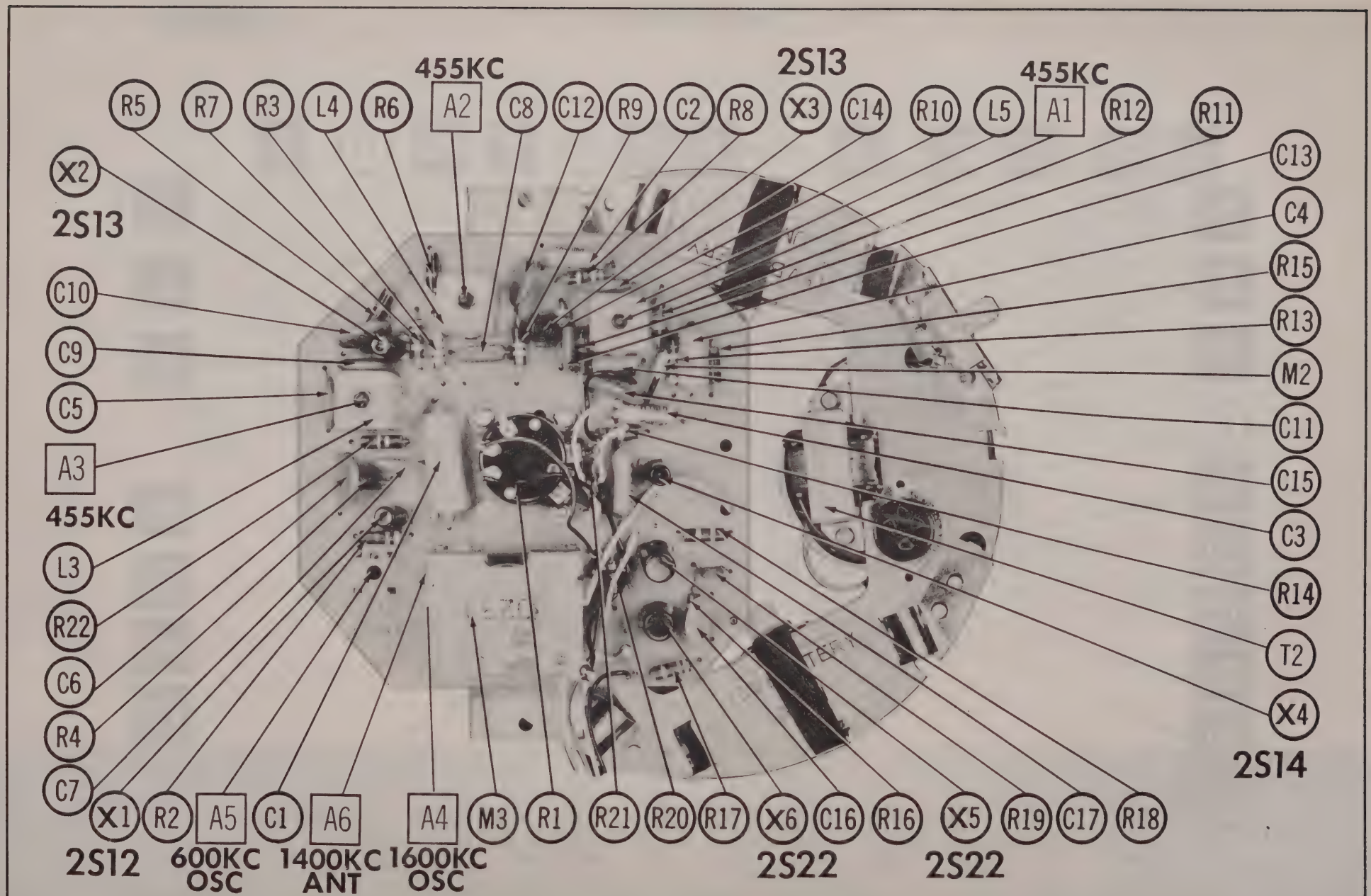
ITEM No.	PART NAME	TOSHIBA PART No.	NOTES
M3	Tuning Cap.		2 Gang, Ant. 10-170mmf, Osc. 9-88mmf
M4	Switch		Tone (SPST, Slide Type)
	Printed Board	60192	

CABINETS & CABINET PARTS

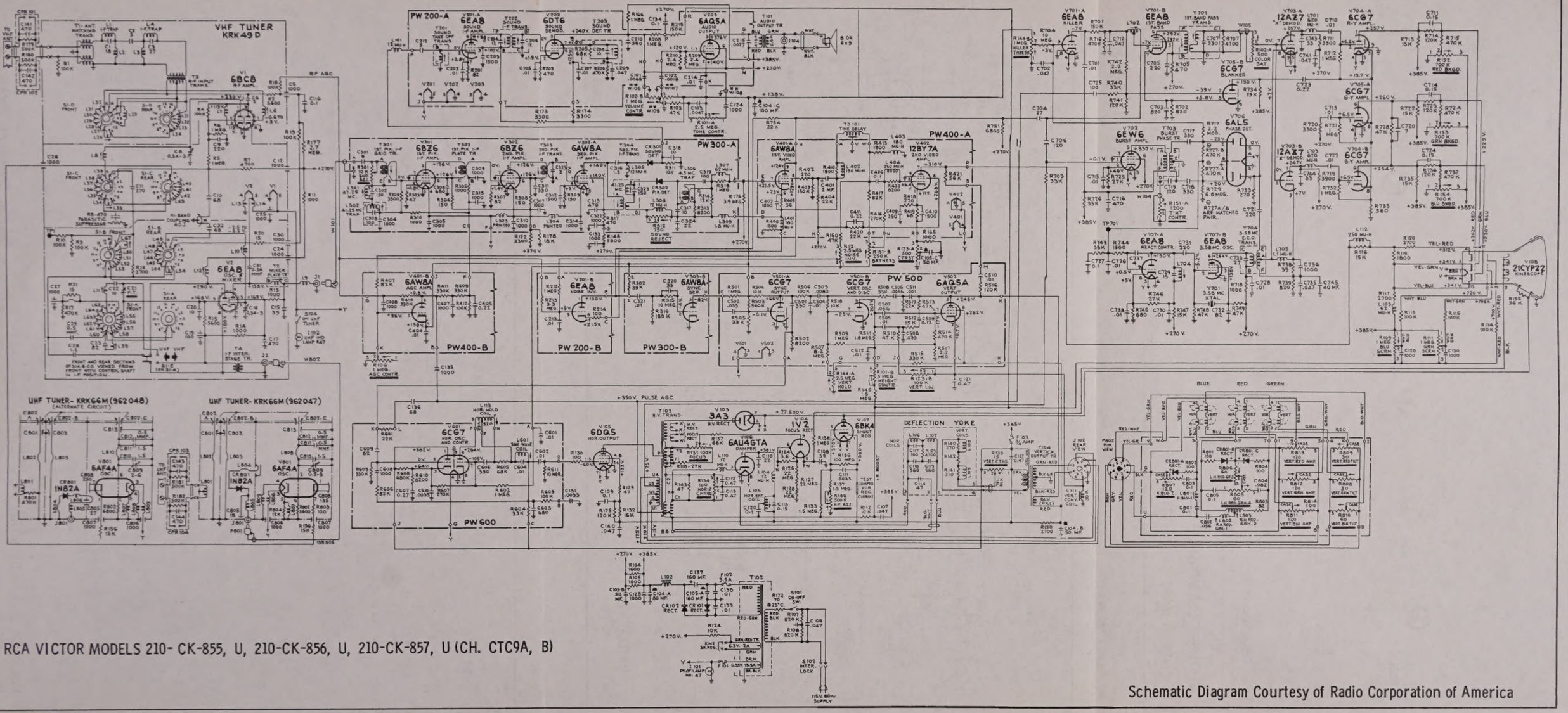
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

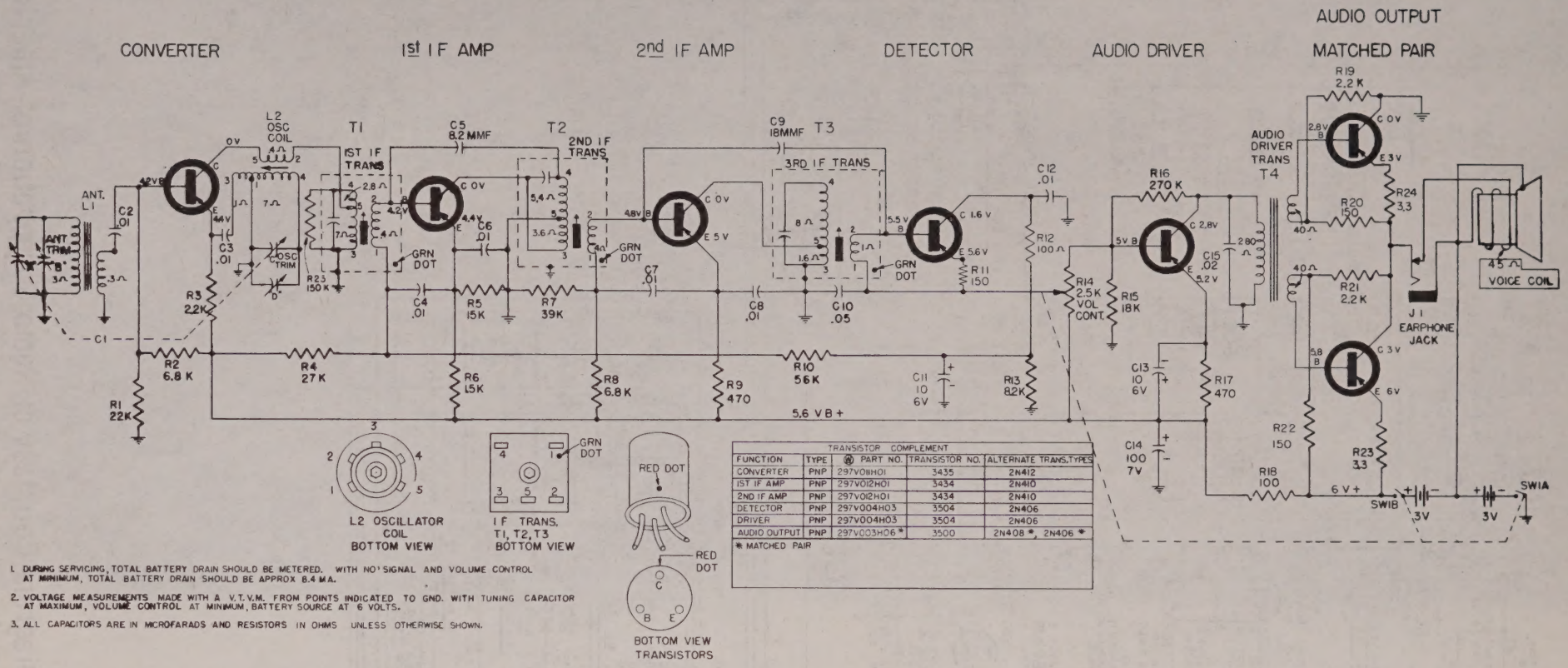


CHASSIS TOP VIEW



RCA VICTOR MODELS 210- CK-855, U, 210-CK-856, U, 210-CK-857, U (CH. CTC9A, B)

Schematic Diagram Courtesy of Radio Corporation of America



TRANSISTOR COMPLEMENT

FUNCTION	TYPE	Ⓦ PART NO.	TRANSISTOR NO.	ALTERNATE TRANS. TYPES
CONVERTER	PNP	297V011H01	3435	2N412
IST IF AMP	PNP	297V012H01	3434	2N410
2ND IF AMP	PNP	297V012H01	3434	2N410
DETECTOR	PNP	297V004H03	3504	2N406
DRIVER	PNP	297V004H03	3504	2N406
AUDIO OUTPUT	PNP	297V003H06*	3500	2N408*, 2N406*

* MATCHED PAIR

1. DURING SERVICING, TOTAL BATTERY DRAIN SHOULD BE METERED. WITH NO SIGNAL AND VOLUME CONTROL AT MINIMUM, TOTAL BATTERY DRAIN SHOULD BE APPROX 8.4 MA.
2. VOLTAGE MEASUREMENTS MADE WITH A V.T.V.M. FROM POINTS INDICATED TO GND. WITH TUNING CAPACITOR AT MAXIMUM, VOLUME CONTROL AT MINIMUM, BATTERY SOURCE AT 6 VOLTS.
3. ALL CAPACITORS ARE IN MICROFARADS AND RESISTORS IN OHMS UNLESS OTHERWISE SHOWN.

WESTINGHOUSE MODELS H-697P7,

H-698P7, H-699P7 (CH. V-2393-3)

Schematic Diagram Courtesy of Westinghouse Electric Corp.

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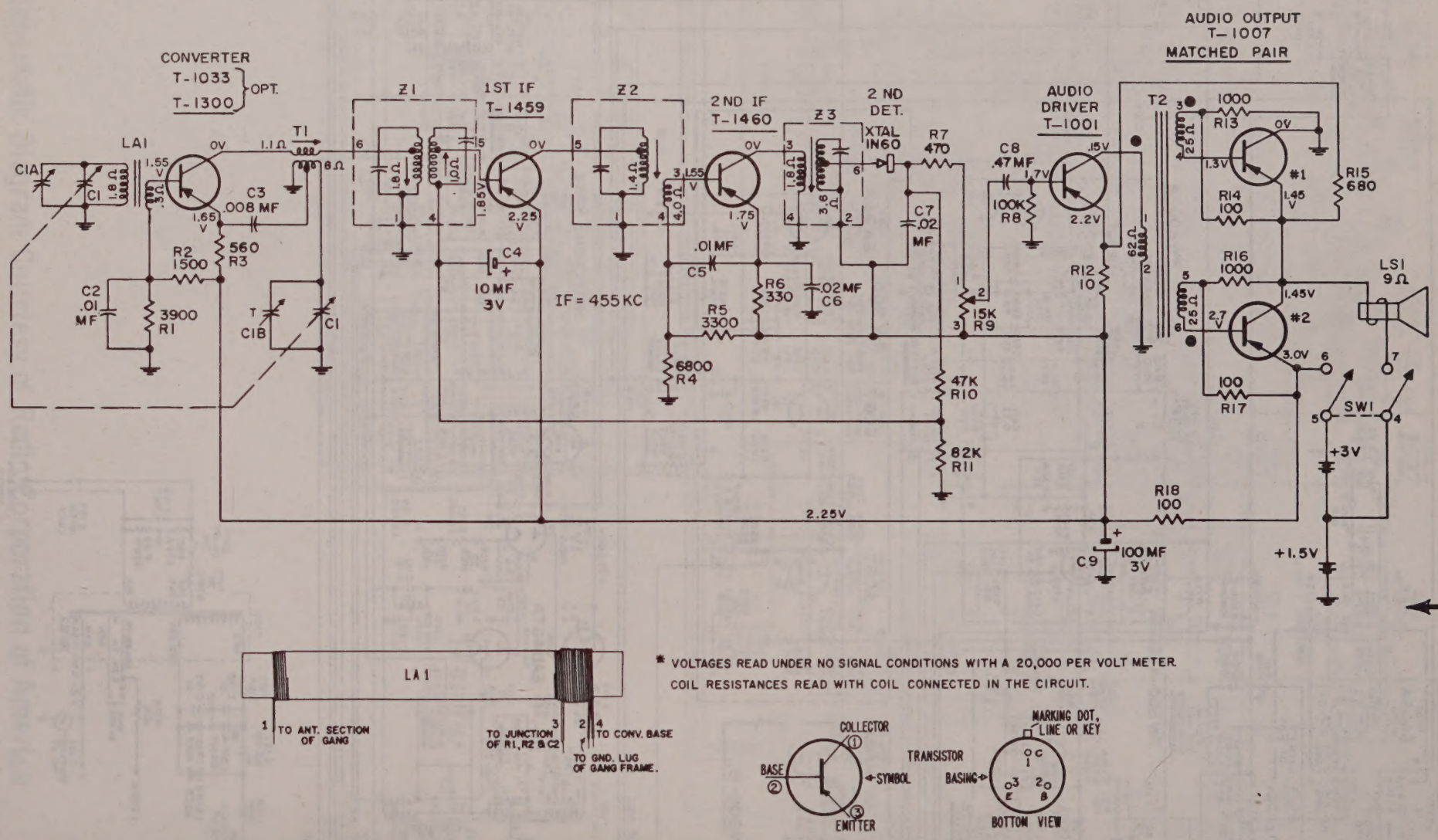

* VOLTAGES READ UNDER NO SIGNAL CONDITIONS WITH A 20,000 PER VOLT METER.
COIL RESISTANCES READ WITH COIL CONNECTED IN THE CIRCUIT.

PHILCO MODEL T-65

Schematic Diagram Courtesy of Philco Corporation